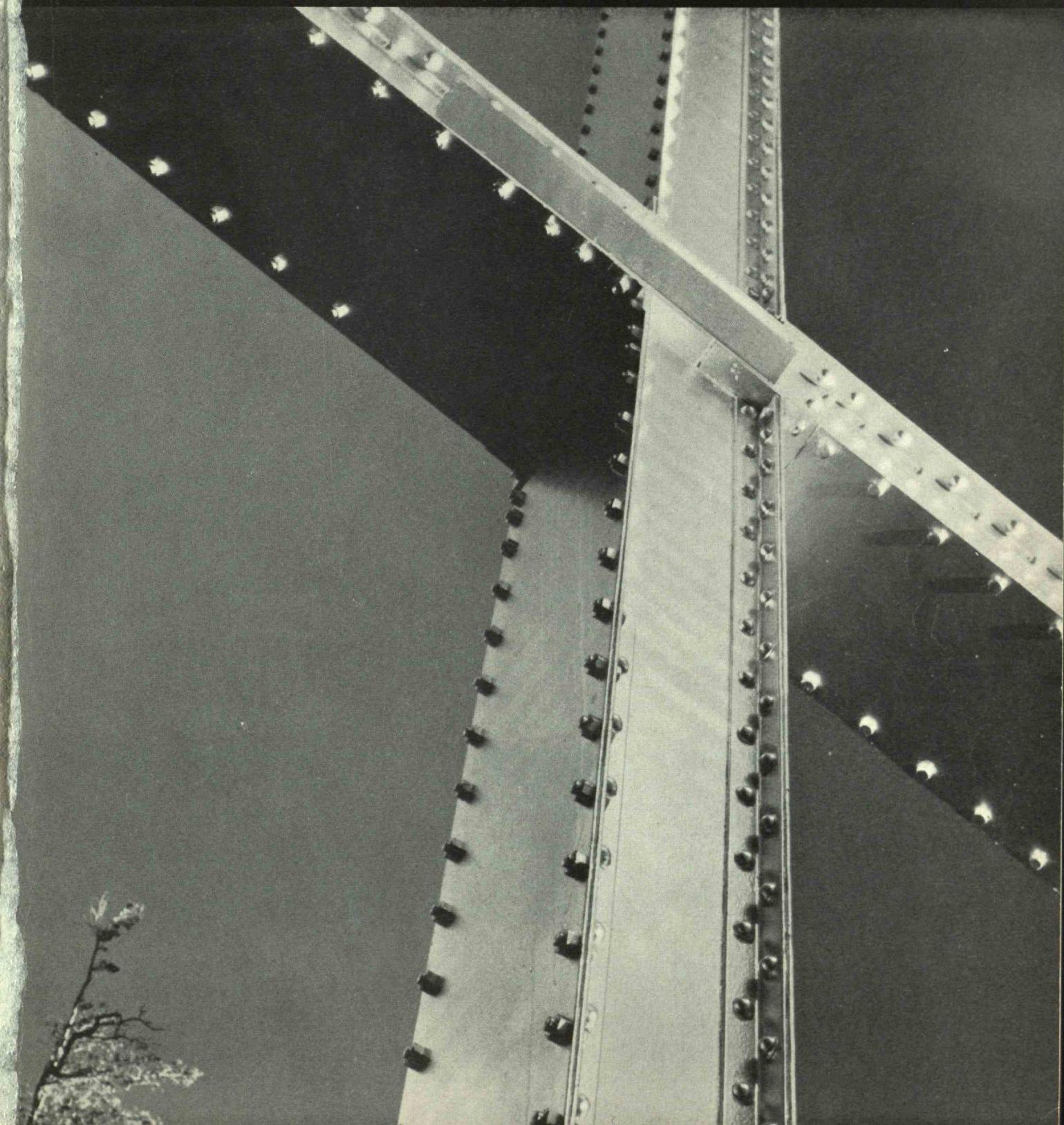


November 1947

# TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office



# technology review

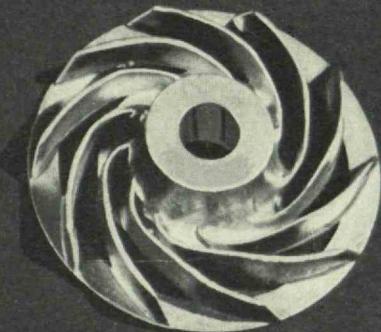
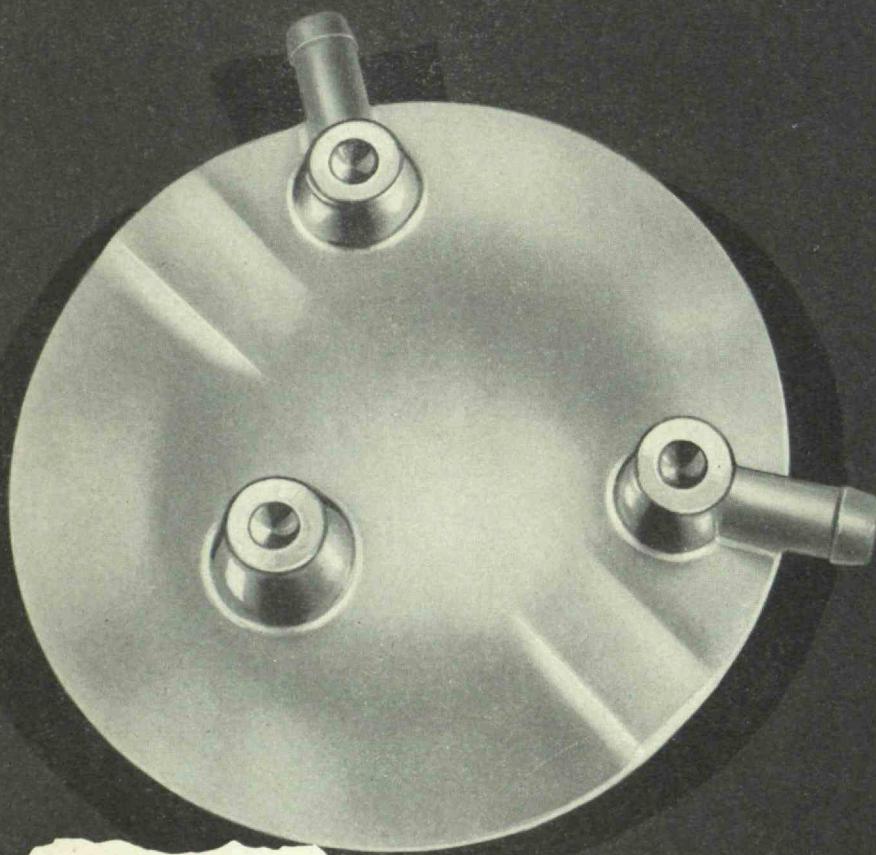
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Brass...  
*SMOOTH FORGED*



SIMPLE OR  
INTRICATE

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FORGINGS IN ALUMINUM • BRASS • BRONZE • COPPER • MAGNESIUM • MONEL • ALLOYS

MACHINING FACILITIES

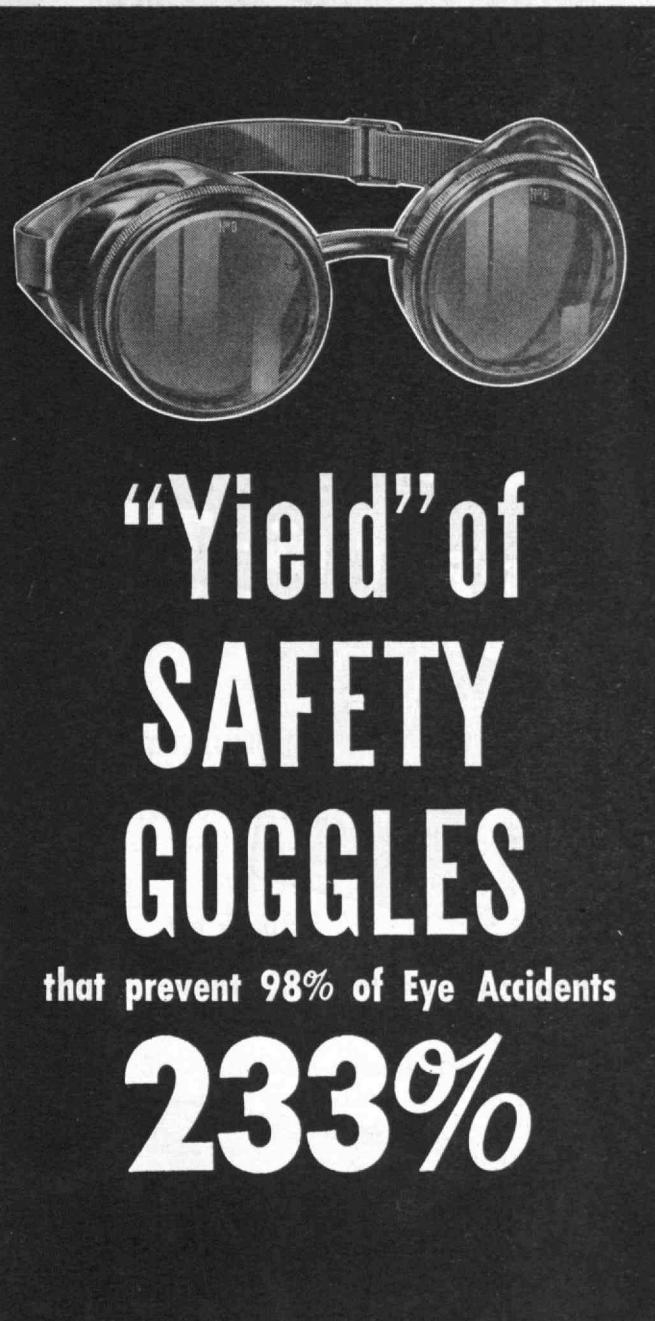
# Why Safety Goggles are a Worthwhile Investment for Management



Yield of Industrial Bonds  
Approximately **3%**



Yield of Common Stocks  
**4-7%**



**"Yield" of  
SAFETY  
GOGGLES**

that prevent 98% of Eye Accidents

**233%**

Industrial eye accidents average \$5.00 per worker per year. Where else on an expenditure of \$1.50 (average cost of goggles) could you obtain a "return" of \$3.50—or 233% on your investment? Your AO Safety Representative has complete details about how an adequate eye protection program can cut *your* costs.

American  Optical

COMPANY

*Safety  
Division*

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2

OUTSTANDING FEATURES

- Continuous frequency coverage from 550 kc. to 55 mc.
- Bandswitching in 5 ranges. Bandspread tuning at any frequency.
- Seven tube superheterodyne (plus rectifier and voltage regulator).
- Automatic Noise Limiter.
- Built-in loudspeaker and A.C. power supply.
- R. F. stage with panel controlled antenna trimmer.
- Operates from 105-130 volts, 50-60 cycles A.C. (Provision for battery operation.)
- Housed in a streamlined gray cabinet.

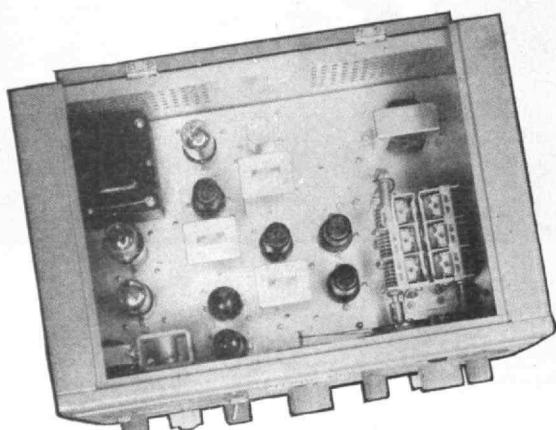
AMATEUR NET.....\$89.50



## HERE IT IS—THE NEW NC-57



The SM-57 Signal Strength Meter has been designed as an accessory to be used in conjunction with the NC-57.



INTERIOR OF NC-57



To meet the needs of the many hams who have asked for a sensitive, first-rate bandswitching receiver in the lower price bracket, complete with speaker and power supply in one cabinet, the National Company has developed the brand-new NC-57.

The CW operator will enjoy the stable operation and excellent signal-to-noise ratio of the NC-57.

The phone operator will be pleased with the tone quality and selectivity.

The SWL will log DX stations with ease and clarity. In fact, any operator now operating a communications receiver will find the NC-57 essential as a standby. In this price class, the new National NC-57 is an outstanding value. See and hear one at your local distributor's ham shack this week.

**national**  
Company, Inc.  
Dept. No. 18  
Malden, Mass.

MAKERS OF LIFETIME RADIO EQUIPMENT

# 32 ALUNDUM

## One Year Old



*. . . And Every Bit  
as Good as Predicted*

**32** ALUNDUM abrasive has made good on every one of the Hollywood adjectives used to describe it a year ago. In plant after plant 32 ALUNDUM grinding wheels really are proving sensational — really do cut costs by:

**grinding faster  
grinding cooler  
having longer life  
requiring fewer dressings**

32 ALUNDUM abrasive is entirely new — made differently by a Norton-invented and Norton-patented process.

Each grain is a single, complete crystal — not crushed to size.

Each grain has many sharp points on all sides for faster, cooler cutting.

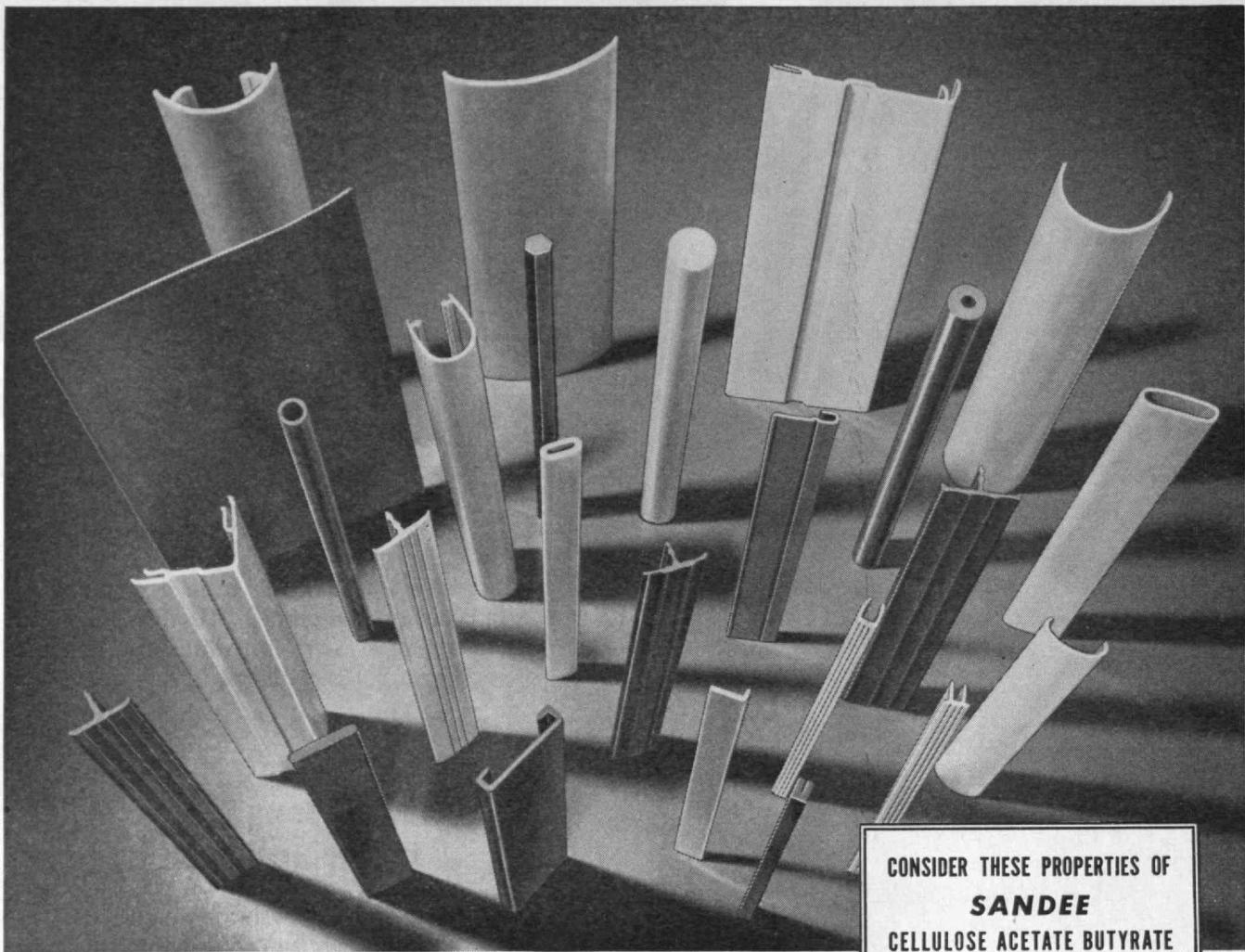
Each grain is over 99% pure fused alumina for greater resistance to dulling.

32 ALUNDUM wheels are available in all standard sizes. They can cut costs for you on cylindrical, centerless, surface, tool and internal grinding.

NORTON COMPANY  
WORCESTER 6, MASS.



**NORTON ABRASIVES**



## *Sandee* CELLULOSE ACETATE BUTYRATE *Extrusions*

**T**HIS general purpose material, under the trade name TENITE II, has attained an excellent reputation for appearance and serviceability in widely diversified fields. This is not only true in injection molded and fabricated items but is equally true in Extruded Rods, Tubes, and simple and complicated shapes. Colorful, tough, easily machined and easily formed to fit specific contours, it is serving to complete satisfaction in fields ranging from rods and tubes for toys to furniture and refrigerator trim.

Study the properties of this excellent general purpose material, then check with *Sandee* for confirmation of suitability to your requirements. *Sandee's* practical know-how in extrusion often helps in altering designs for improvements in functional utility, appearance, and cost.

**CONSIDER THESE PROPERTIES OF  
*SANDEE*  
CELLULOSE ACETATE BUTYRATE**

1. Specific Gravity	—1.22
2. Tensile Strength	—3000 to 5000 p.s.i.
3. Impact Resistance	—Excellent at normal temperatures
4. Heat distortion	—170° to 185°F.
5. Rigidity	—Good to very good
6. Dimensional Stability	—Good to very good
7. Water Absorption	—1 to 2%
8. Burning Rate	—Slow
9. Odor	—Nil to faint
10. Color	—Unlimited
11. Finish	—Excellent
12. Machinability	—Excellent

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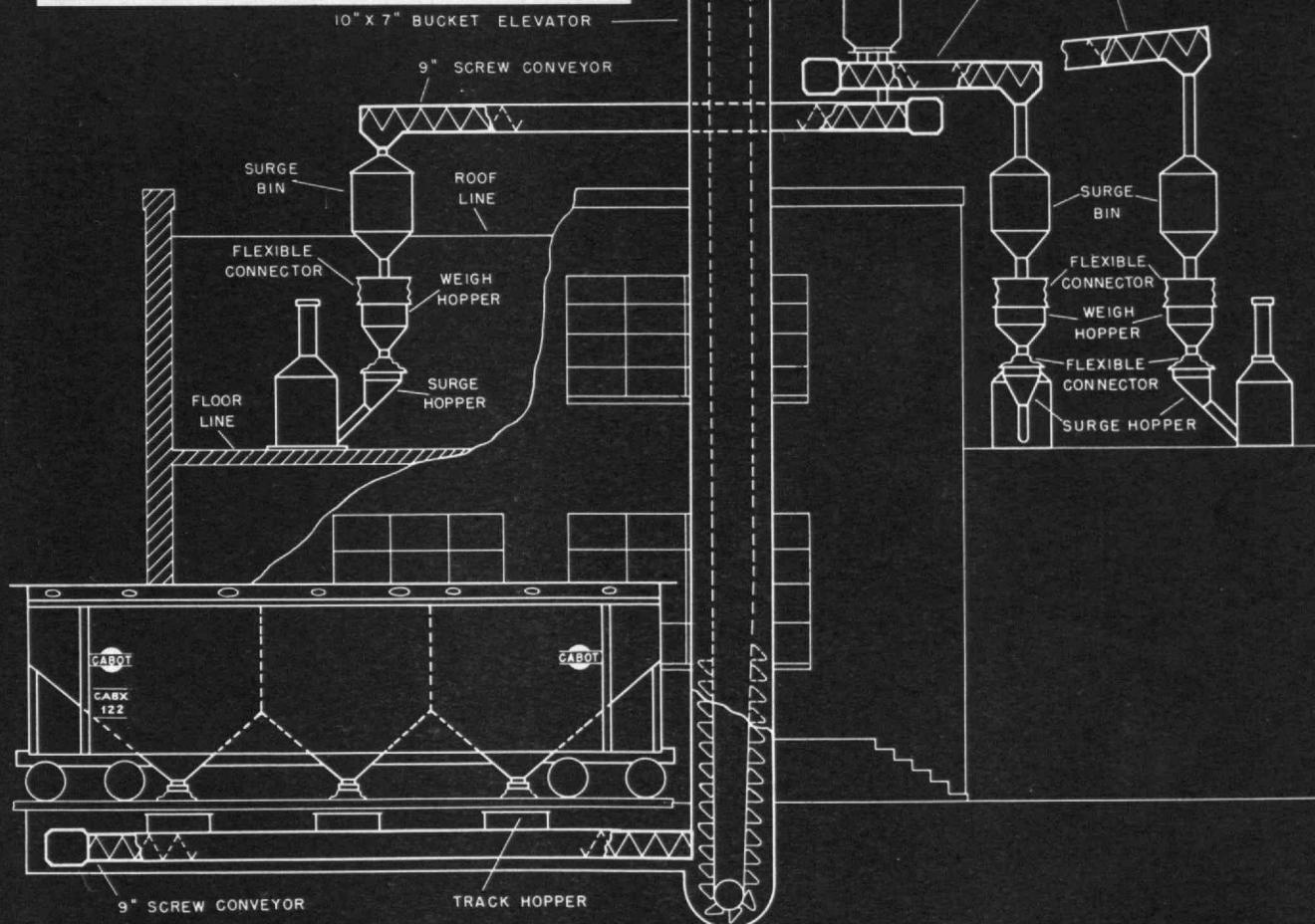
EXTRUDED PLASTICS AND SPECIAL TOOLS

## Engineering Know-How

Equipment for handling carbon black in bulk was a revolutionary innovation when Cabot engineers first introduced the idea to the rubber industry. It seemed impossible.

But Cabot, taking first things first, developed the Spheronicator, which converts finely divided carbon black particles into dustless pellets. Next, Cabot engineers drew specifications for a special hopper car for shipment of carbon black in bulk. Then, they cooperated with engineers in the rubber industry during installation of bulk handling systems in their factories, with consequent economies and improved manufacturing processes.

>This drawing shows the principles used in a bulk handling system in a rubber plant. It typifies, too, the service provided manufacturers using Cabot raw materials by Cabot Technical Sales and Service, and Cabot engineering.



**CABOT**

# GODFREY L. CABOT, INC.

77 Franklin Street, Boston 10, Mass.



## **AFTER YOU GET BACK FROM THE SHOW...**

### ***don't get off this one train of thought***

Don't sidetrack all those ideas on new products, markets and cost-reduction which you brought back, red hot, from Chicago — just because you lack plant facilities, equipment, or hours in the day.

Take your new ideas — or your bothersome old problems—to Taft-Peirce, where you will find all these services and products at your ready command:

**Engineering, Tooling, Contract Manufacturing:** To your specs or blueprints, the T-P Contract Division will tool and produce anything from a single tool or part to complete mechanisms in lots of any quantity.

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Surface Grinder and the 6" Rotary Surface Grinder for high precision and fine finish on small flat work. The New Taft-Peirce Spline and Gear Grinder. The Taft-Peirce Back Spot Facing Machine.

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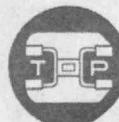
**Standard & Special Gages:** All types of AGD Standard plain and thread plug, ring, and snap gages. Special designs to specification. The new Taft-Peirce CompAIRator air gage.

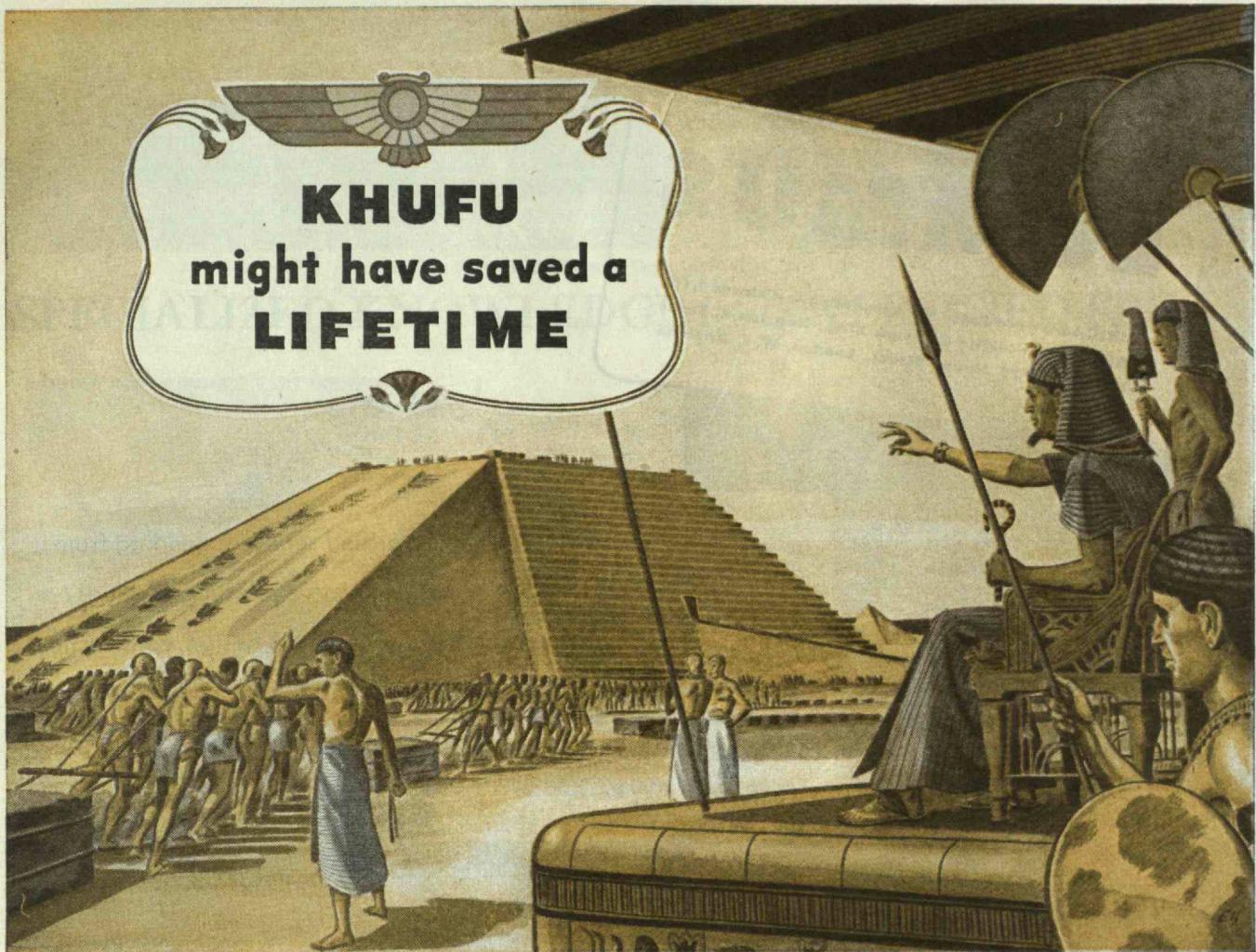
**Magnetic Chucks:** Rectangular, rotary, and tilting-base chucks of exclusive T-P SUPER-POWER design. Magnetic V-blocks and angle plates.

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*... for Engineering, Tooling, Contract Manufacturing*

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KING KHUFU had only *slave*-power with which to build the greatest of the pyramids. With *engine*-power, he might have saved a lifetime and the lives of 300,000 slaves.

Today, mightier and much more useful structures spring from dream to drawing board to reality in relatively short spans of time. Modern construction equipment powered by internal-combustion engines makes this possible. For today, the machine is the slave of man. Great dams, soaring bridges, towering buildings and broad highways are ours without backbreaking toil and wasted flesh and blood.

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**PRODUCTION.** *Premium performance* has been a consistent goal in the production of hundreds of thousands of Diesel injection systems and millions of electrical units.

**MAINTENANCE.** *The world over*, American Bosch authorized service stations keep the equipment operating efficiently.

# AMERICAN BOSCH

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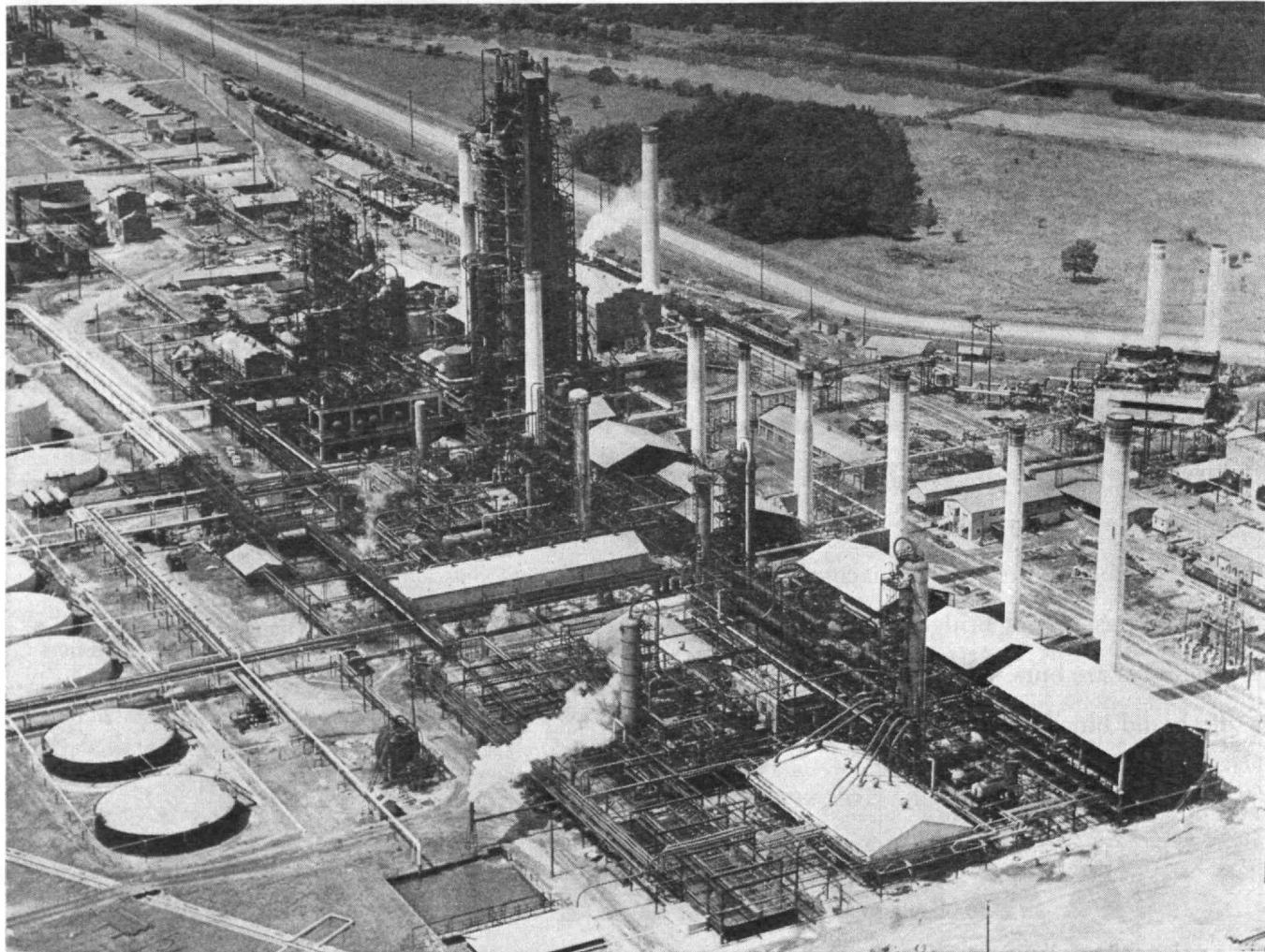
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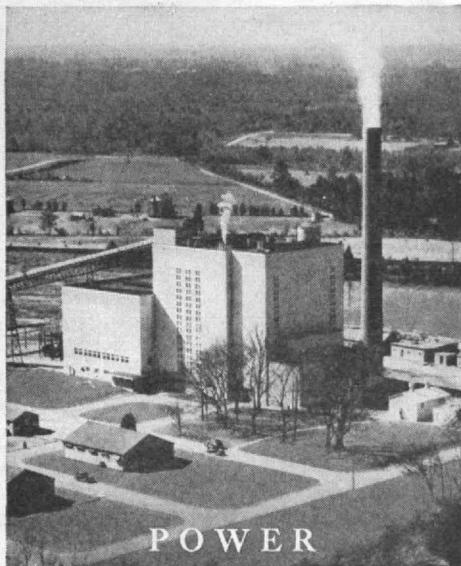
# SPECIALIZED KNOWLEDGE IN DIVERSIFIED FIELDS



## INSTITUTIONS

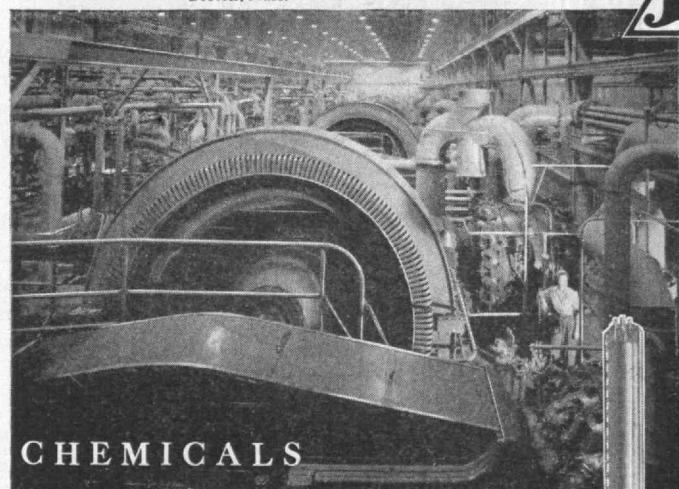
Proposed Children's Medical Center,  
Boston, Mass.

**S**ince 1889, Stone & Webster Engineering Corporation has been engaged in the solution of design, engineering and construction problems. This experience is available to companies looking toward the future.



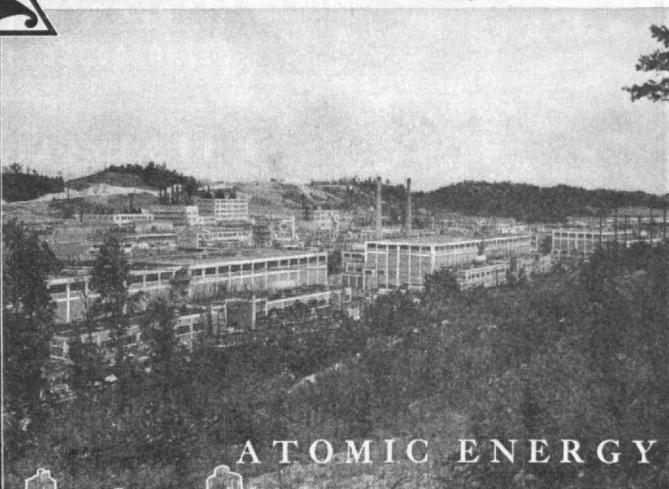
## POWER

Chesterfield Power Plant, Virginia Electric & Power Company



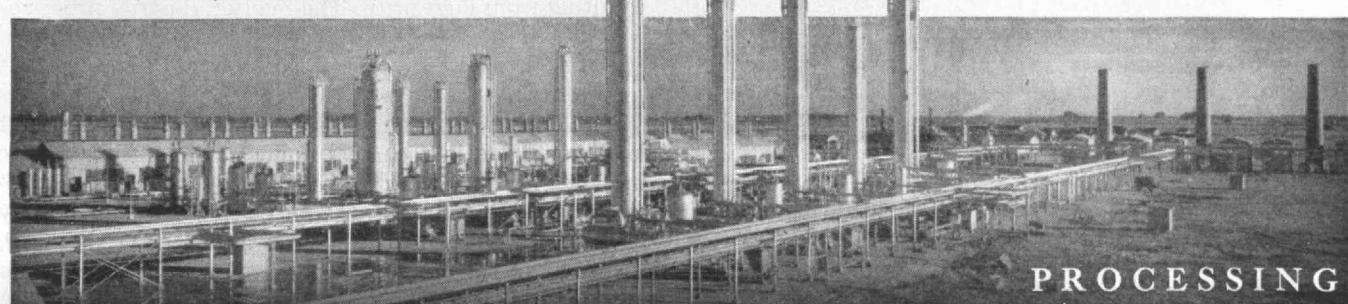
## CHEMICALS

Tennessee Valley Authority Ammonia Plant



## ATOMIC ENERGY

Electromagnetic Plant, Oak Ridge, Tennessee



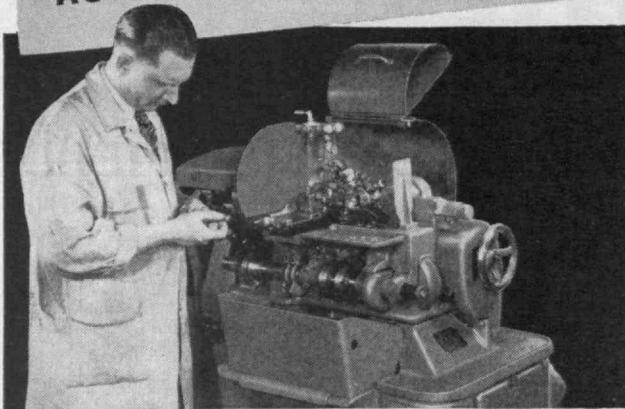
## PROCESSING

Erath Cycling Plant, Vermilion Parish, Louisiana

**STONE & WEBSTER ENGINEERING CORPORATION**

A SUBSIDIARY OF STONE & WEBSTER INC.

## NEW DESIGN "OOG" AND "OG" AUTOMATIC SCREW MACHINES



• These Automatic Screw and Automatic Cutting-Off Machines feature 196 two-speed combinations including a wide range of high to low speed ratios. Equal cutting efficiency is obtained on all materials from alloy steel to plastics, and on the widest range of work diameters. Large assortment of attachments available. Complete details and specifications on request. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

**BROWN & SHARPE** 



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Boston 10, Mass.

Manufacturers of braided cords of all kinds, including sash cord, clothes line, trolley cord, signal cord, shade cord, Venetian blind cord, awning line, etc., also polished cotton twines and specialties.

### SPOT CORD

Reg. U. S. Pat. Off.



Our extra quality sash cord, distinguished at a glance by our trade-mark, the colored spots. Especially well known as the most durable material for hanging windows, for which use it has been specified by architects for more than half a century.

## THE TABULAR VIEW

**Aviation Progress.** — In the future, speed and weight of aircraft are not factors which the aeronautical engineer alone may determine; rather are they matters which will require the wholehearted co-operation of construction engineers as well. The reason for this state of affairs, as LIEUTENANT COLONEL WILLARD ROPER, '38, enumerates (page 24) is that for several years already large aircraft have taxed terminal ground facilities which can be built economically with present construction methods. Thus, in the opinion of Colonel Roper, future progress in air power must await advances in construction power. As a student Colonel Roper was active in extracurricular affairs and received his degree from the Institute in 1938. Upon completion of his studies in Course XV, he was an industrial engineer for the Electrolux Corporation until he entered active military service in July, 1941, as an officer in the Corps of Engineers. From October, 1942, to December, 1945, Colonel Roper held various air engineering posts in the Army Air Forces. He accepted a regular Army commission in July, 1946, and is now Assistant Air Engineer, Headquarters, Army Air Forces, Washington.

**Research for Education.** — From time to time, and particularly in the past six years, it has been reported that the vast program of research in which the Institute has necessarily participated, has sometimes caused eyebrows to be raised. Fundamentally, of course, M.I.T. is an educational institution whose foremost product is capable men (and women) thoroughly trained as engineers and scientists. Certainly research will play a most important role in the professional lives of Technology graduates. It should not be too much to expect research to make its own unique contribution to their education. The Review is pleased to publish (page 29) an address on this subject, presented in Minneapolis last summer before the American Society for Engineering Education, by JAMES R. KILLIAN, JR., '26, Vice-president of M.I.T. With unusual competence, Dr. Killian takes advantage of his present administrative post and his past achievements as editor of The Review in conveying the message that the contribution which research may be expected to make in advancing higher education is the policy guiding the Institute's acceptance of sponsored research projects.

**Fresh Air for Industry.** — Although constituting one fifth of the air we breath, oxygen has been limited in its industrial applications because of its relative scarcity resulting from high price. The many industrial processes which can be made considerably more efficient and effective through greater utilization of oxygen are about to obtain a new lease on life as a result of recent methods for producing large quantities of oxygen of high purity at low cost. From a technical point of view, some of the methods for supplying industry with fresh air have already been enumerated in The Review last January by Samuel C. Collins. In this issue EARL P. STEVENSON, '19, President of Arthur D. Little, Inc. presents (page 32) an authoritative discussion of the future role of oxygen in industry. After receiving his bachelor of science degree from Wesleyan University in 1916, Mr. Stevenson spent

(Concluded on page 14)

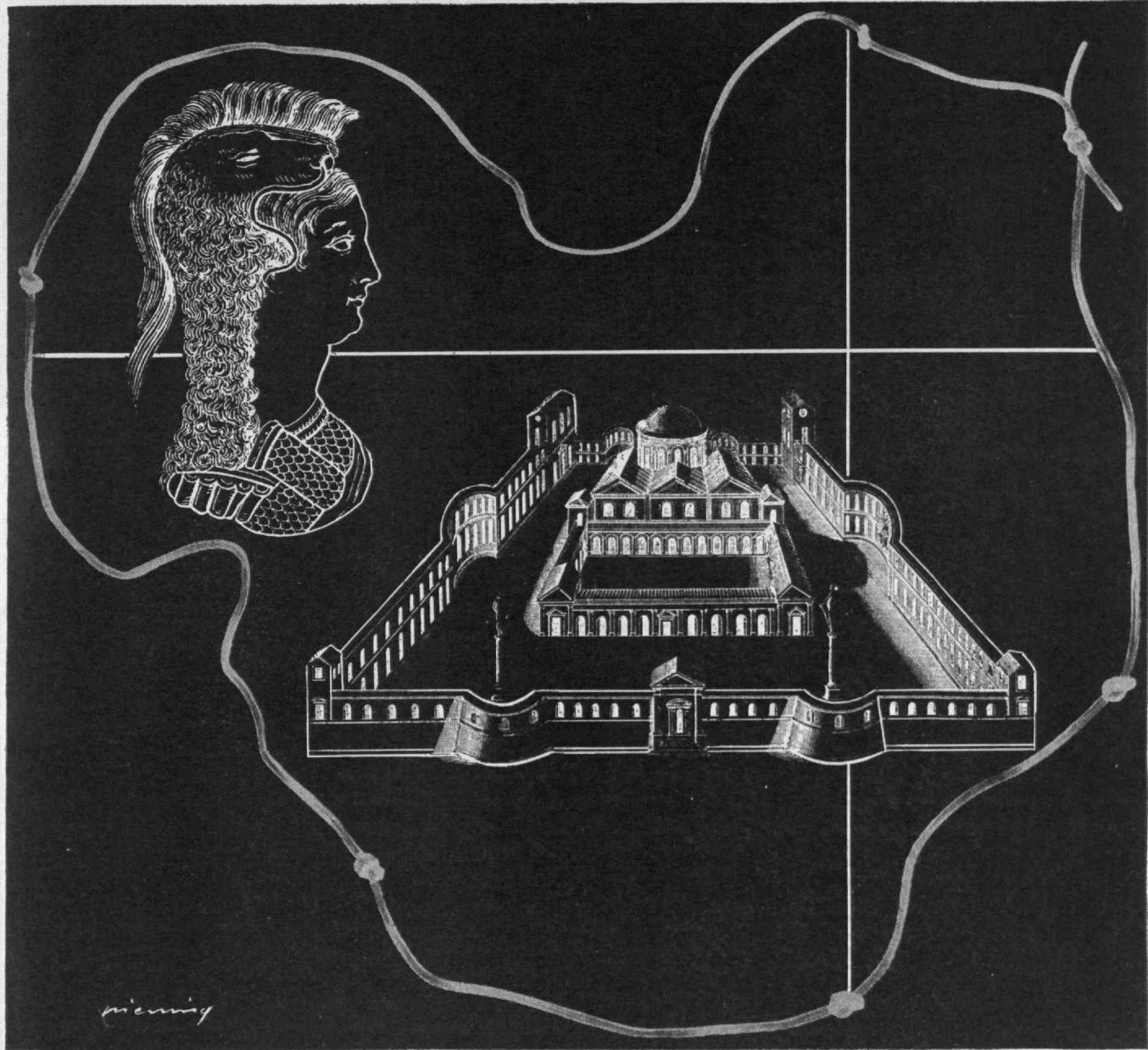
## A LITTLE DOES A LOT

According to legend, when the city of Carthage was founded, Queen Dido was told that she could have only as much land as could be encompassed by an ox hide. But the queen made the most of her material by cutting it into a single, continuous leatheren string, with which she circled considerable acreage.

Making materials serve to the fullest is just as

important to users of steel today as it was to Dido. Except that today no tricks are necessary.

It can be done in many instances by specifying molybdenum steels. Their hardenability, freedom from temper brittleness and good strength-weight ratio help to simplify design problems and insure good performance. It will pay you to investigate their practical advantages.



MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"  
CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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500 Fifth Avenue • New York City

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## PERMANENT MAGNETS

*Depend on them  
for Uniformly  
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in every  
PHYSICAL, MAGNETIC  
and METALLURGICAL  
Characteristic*

You would find it hard to set a requirement on Arnold magnets that is not already exceeded in our regular production procedure.

All Arnold products are made on a basis of 100% quality-control at *every* step of manufacture. These rigidly maintained standards cover all physical, magnetic and metallurgical characteristics... you can place complete confidence in the uniformity and dependability of Arnold Permanent Magnets, and their resultant performance in your assemblies.

Remember, too, that Arnold's service covers all types of permanent magnet materials, any size or shape of unit, and any field of application. Our engineers are at your command—write us direct or ask any Allegheny Ludlum representative.

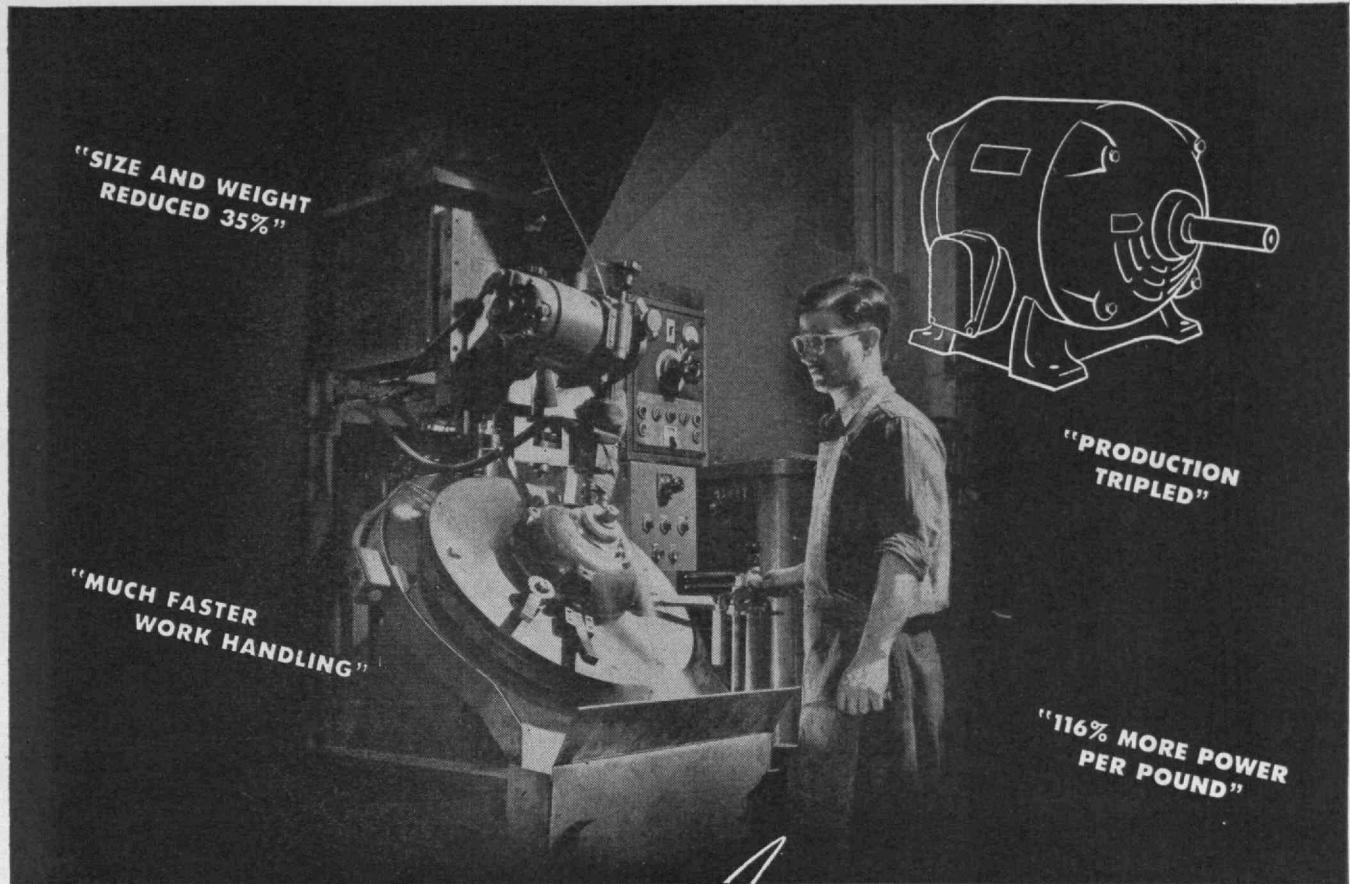


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Subsidiary of

ALLEGHENY LUDLUM STEEL CORPORATION  
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from our own production experience

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Write or phone your nearest Westinghouse office for details.

When we say automatic welding is *better, faster, cheaper* . . . we can prove it right in our own plants. Westinghouse not only makes automatic welding equipment, we're also one of its largest users.

At Buffalo, automatic welding permitted our designers to accomplish these outstanding results in producing the new LIFE-LINE motor: *size and weight reduced 35%* . . . *power capability increased 116% per pound* . . . *parts for complete line of NEMA motors reduced from 2,600 to 128* . . . *production tripled*.

Once a setup is made, automatic welding becomes a "pushbutton" operation. Even with relatively unskilled labor, every weld is made perfectly. At last, welding approaches machine tool accuracy and speed of work handling.

Westinghouse is the *first* manufacturer to offer complete, "packaged" automatic welding equipment — built, sold and installed as a unit. A Westinghouse welding specialist is ready now to help you apply this improved metal-joining technique to your assembly problems.

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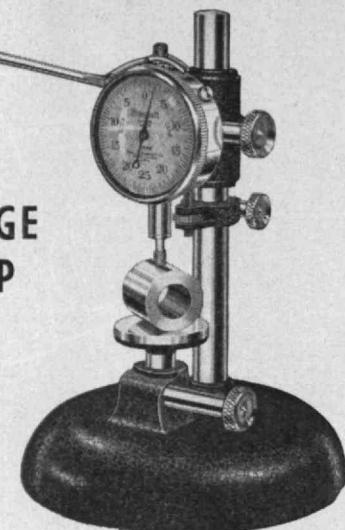
MORE PRODUCTIVE POWER FOR INDUSTRY



STARRETT No. 654

INSPECTOR'S DIAL  
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Easy to adjust, easy to use, this STARRETT Precision Bench Gage works full time as a production inspection gage for duplicate parts or for quick, accurate measuring of metal, rubber, textiles, paper, leather, veneer, plastics, mica, etc. Shown with STARRETT No. 25-B

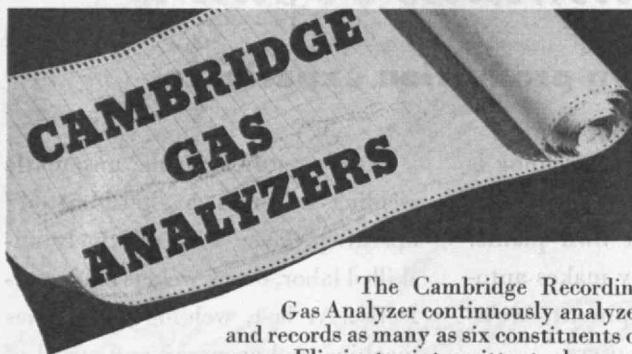
Dial Indicator (graduated .0005"; 0-25-0) it can be furnished with any desired indicator. Adjustable for table and indicator height with lateral and fine perpendicular adjustment. Range 0 to 3 inches, base diameter 5½ inches, height 8 inches.

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THE L. S. STARRETT CO. • ATHOL • MASSACHUSETTS • U. S. A.  
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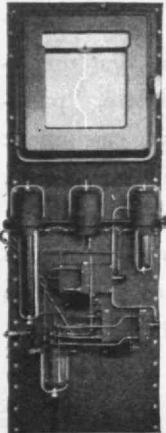
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PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK  
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The Cambridge Recording Gas Analyzer continuously analyzes and records as many as six constituents of a gas. Eliminates intermittent, slow and expensive manual gas analysis. Accurate . . . Sensitive . . . Simple. No moving parts; utilizes thermal conductivity principle.

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Pioneer Manufacturers of

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## THE TABULAR VIEW

(Concluded from page 10)

two years as an instructor in chemistry at M.I.T. from which he received his master of science degree in 1919. During World War I, Mr. Stevenson saw active duty with the Chemical Warfare Service, and during the more recent conflict was chief, Division 11, National Defense Research Committee. Mr. Stevenson has been with Arthur D. Little, Inc. since 1919, and since 1935 has been president of this well-known firm of consultants.

**Surface Chemistry.** — Writing with the authority of a quarter of a century of research in the field, PROFESSOR ERNST A. HAUSER reminds Review readers (page 36) that the signal successes of this country's rubber industry are dependent upon accurate knowledge of the events transpiring in the microcosms of colloids. After receiving his doctorate from the University of Vienna in 1921 and completing a one-year appointment as assistant to Max Born, Dr. Hauser assumed charge of the research laboratory for the Krause Spray Drying Laboratory in Frankfurt from 1922 to 1925. He was head of the Colloid Chemical Laboratories of Metallgesellschaft A. G. from 1925 to 1932 and in charge of research and development of Semperit Austro-American Rubber Works, Ltd. in Vienna from 1933 to 1935. Since 1935, when he joined the Department of Chemical Engineering at M.I.T. as a resident associate professor, Dr. Hauser has continued his outstanding researches in colloidal chemistry and has also found time to take part in activities of numerous professional societies.

**Leaving the Portals.** — In what will be one of the last "off season" commencement exercises resulting from the accelerated courses offered during the war, 442 degrees were awarded to 439 graduates on September 26. Before departing for professional posts in industry or academic life, members of the Class of 9-47 were privileged to be addressed by PRESIDENT COMPTON whose stimulating commencement address is recorded on page 38.

Speed with  
Economy



R. H. Macy & Co., Inc.  
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Sound construction, speed, economy — have made a large majority of our present contracts repeat orders. Something to remember when you need a new building.

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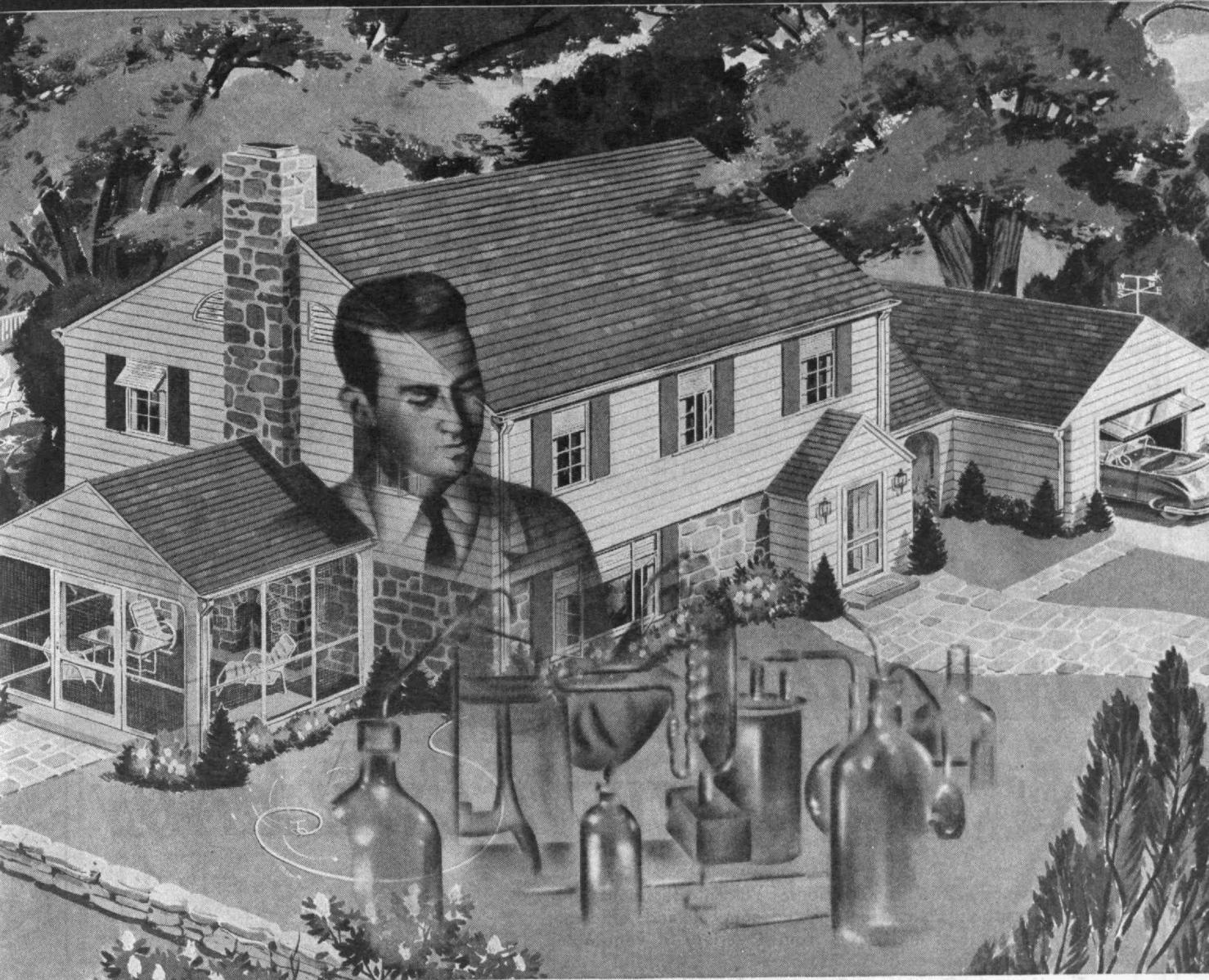
101 PARK AVENUE, NEW YORK

INDUSTRIAL CONSTRUCTION

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"The great highroad of human welfare lies along the old highway of steadfast well-doing"

—SAMUEL SMILES



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HOMES, like human beings, need stout "constitutions" . . . which depend, in turn, on building products used. And these are getting better all the time.

In building or remodeling today, you can choose weather-defiant paint . . . warm-hued and *lasting* plastic tiles for kitchens and bathrooms . . . hardware and window screens of stainless steel or any-purpose plastics.

Yours, too, are heating installations with leakproof welded piping and streamlined plumbing. To say nothing of resin-glued plywood, good for decades as sheathing, sub-flooring, doors and complete interior and exterior walls.

These are a few of today's countless building products that give better service *because into them go better basic materials.*

*Producing better materials for the use of science and*

*industry and the benefit of mankind is the work of the people of UNION CARBIDE.*

It takes basic knowledge and relentless research. Tremendous pressures and extreme vacuums. Heat up to 6000° and cold down to 300° below zero, Fahrenheit. Working with these—and working together—the various Units of UCC now separate or combine nearly one-half of the many elements of the earth.

**FREE:** You are invited to send for the illustrated booklet, "Products and Processes," which describes the ways in which industry uses UCC's Alloys, Chemicals, Carbons, Gases, and Plastics.

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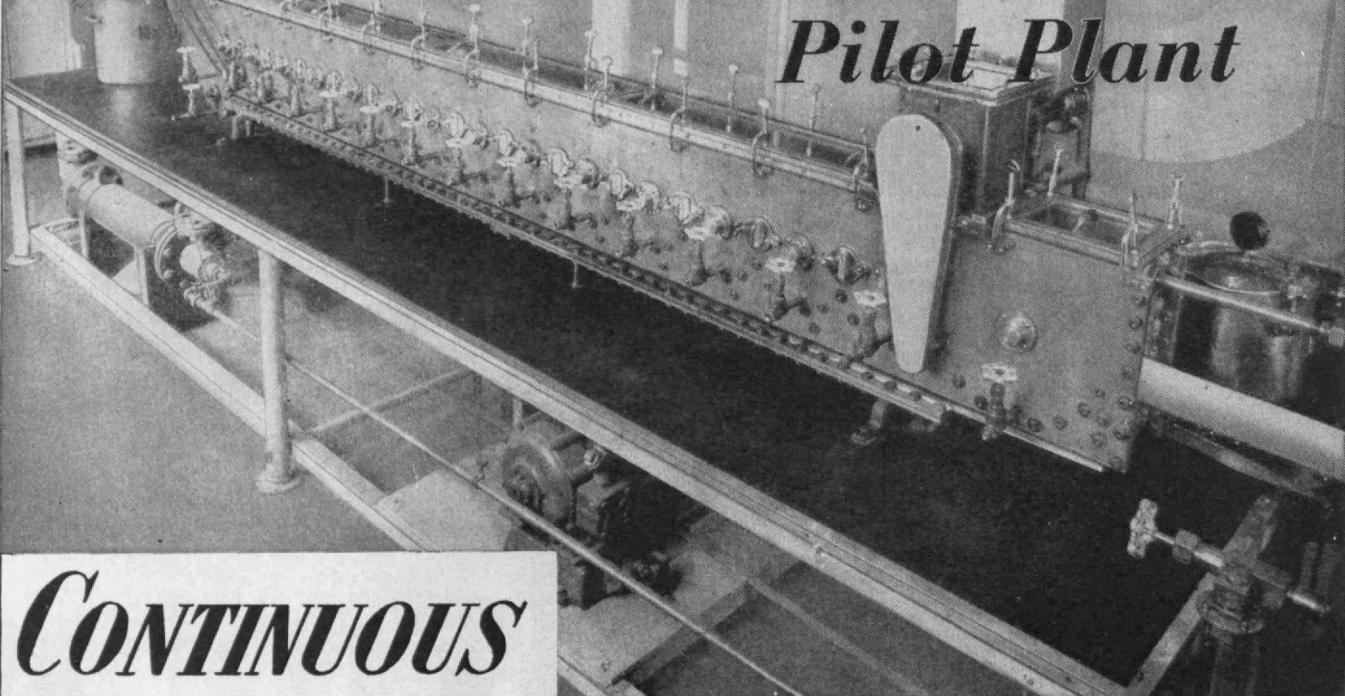
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Counter-  
Current

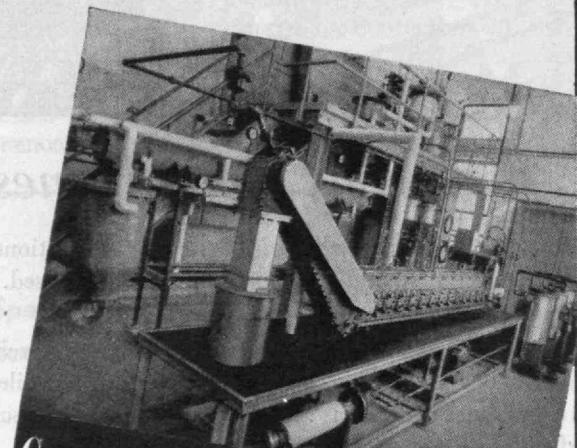
**SOLVENT EXTRACTION**

The Kennedy Extraction Division of Vulcan offers complete Solvent Extraction Plants for the economical and efficient recovery of oils, fats and waxes from a variety of vegetable and animal materials.

The Kennedy Continuous Extractor of stainless steel construction is unique in its ability to handle high oil content materials and finely ground products containing excessive "fines". Materials containing as high as 55% oil are readily extracted to less than 1% in a single, continuous operation. This "one step" method of extraction eliminates the costly "fore-pressing" operation. The Kennedy Extractor is also adaptable to many leaching and washing processes.

Complete pilot plant facilities are available for the comprehensive study of special extraction problems. In conjunction with pilot plant operation, the Vulcan laboratories, adequately staffed by chemical engineers and chemists of long experience, are at your service for analytical work. Vulcan design engineers carefully convert pilot plant data to commercial scale design.

Vulcan has the organization to design, fabricate, erect, and initially operate complete plants to successfully overcome all extraction problems.



*Complete PILOT PLANT Facilities*

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KENNEDY EXTRACTION DIVISION OF

**DISTILLATION  
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EXTRACTION** PROCESSES  
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THE VULCAN COPPER AND SUPPLY CO. - CINCINNATI, OHIO

## THE MARCH OF SCIENCE

# MIRACLE HEAT- without fire or furnace!

HEATING A PIECE OF METAL BY OPEN FLAME, BLOW-TORCH OR FURNACE IS RELATIVELY SLOW—APT TO LEAVE SCALE...IT'S HARD TO HEAT ONE SPECIFIC AREA WITHOUT HEATING THE WHOLE PIECE.

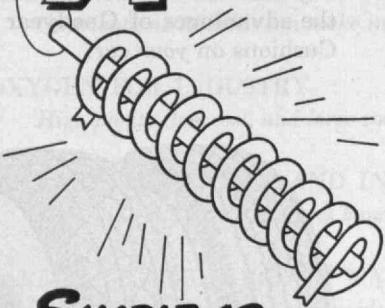


PRODUCTION MEN REALIZED HEAT-TREATING OPERATIONS SUCH AS FORGING, PRECISION BRAZING AND SURFACE HARDENING COULD BE STEPPED WAY UP IF A FASTER METHOD OF HEATING COULD BE FOUND... ONE WHICH WOULD CONCENTRATE THE HEAT AT PRE-SELECTED AREAS!



HEAT BY INDUCTION SEEMED LIKE THE ANSWER. SCIENCE HAD ALREADY DISCOVERED THAT METALS HEAT RAPIDLY WHEN INTRODUCED INTO A HIGH FREQUENCY, HIGH DENSITY MAGNETIC FIELD!

## A NEW ELECTRONIC HEATER DESIGNED BY ALLIS-CHALMERS SCIENTISTS—



### SIMPLE AS

- A PLACE METAL IN WORK COIL...
- B PUSH BUTTON
- C METAL IS HOT IN SPLIT SECONDS

AMAZING PRODUCTION TOOL RECTIFIES ORDINARY 60-CYCLE CURRENT THEN STEPS IT UP TO 450,000 CYCLES. A MAGNETIC FIELD OF HIGH DENSITY IS SET UP IN WORK COIL AND WHEN METAL IS INTRODUCED INTO THIS FIELD, PASSAGE OF CURRENT CAUSES POWER LOSSES WHICH PRODUCE HEAT WITHIN THE METAL WITH INCREDIBLE SWIFTNESS.

**BIG BENEFITS:** COMPLETE, SELECTIVE CONTROL OF HEAT PENETRATION...EXACT UNIFORMITY... GREATLY INCREASED PRODUCTION!

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ELECTRONIC HEATER IS ONE MORE EXAMPLE OF HOW ALLIS-CHALMERS RESEARCH AND EXPERIENCE GO TO WORK FINDING BETTER, FASTER, MORE EFFICIENT WAYS OF HANDLING PRODUCTION PROBLEMS—ANOTHER GOOD REASON WHY A-C EQUIPMENT IS IN DEMAND IN EVERY MAJOR INDUSTRY...



# ALLIS CHALMERS

ONE OF THE BIG 3 IN ELECTRIC POWER EQUIPMENT  
BIGGEST OF ALL IN RANGE OF INDUSTRIAL PRODUCTS



# Here's the new kind of tire that astonished auto engineers!

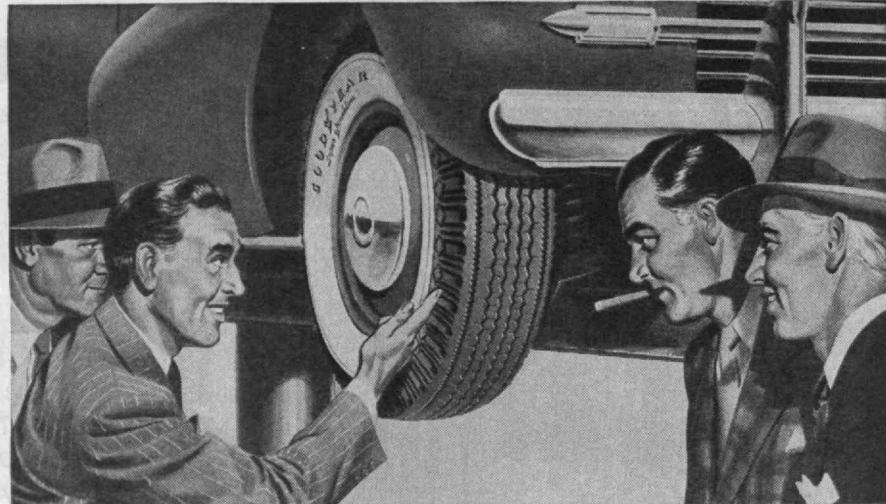
New Super-Cushion by  
Goodyear is first to absorb  
lateral shock satisfactorily

Here's what hard-boiled automotive engineers said when they had tested this completely new kind of tire:

"Let's get that tire on our cars as soon as possible!"

Why? Because here for the first time was a tire that did what *no* tire had ever done before! It satisfactorily absorbed lateral (crosswise) shocks—one of the few things that still had to be engineered out of the modern motor car. It gave an unbelievably smoother ride—not only on rough roads but even on good ones.

Bigger and softer than the conventional tire, the Super-Cushion builds up less pressure. This means it does



The speed with which leading car makers accepted this new kind of tire indicates definitely that it is the tire of the future.

Auto engineers call it the first tire in 15 years to make a positive contribution to driving comfort and safety.

not lose its better riding qualities on a long run.

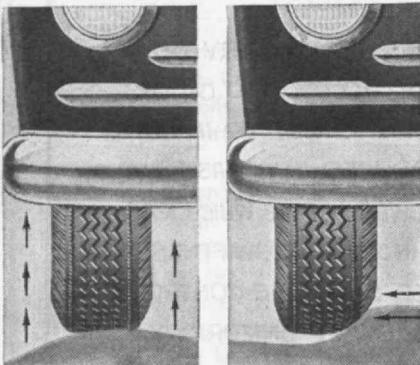
The engineers found that this bigger tire rolls with the punch! It's a *safer* tire! It *yields* instead of resisting impacts. There's less chance of cutting, bruising, or breaking.

And because it's a softer tire with stop notches *molded* across the tread, you get better traction—and *notice* it when you step on the brakes or gas.

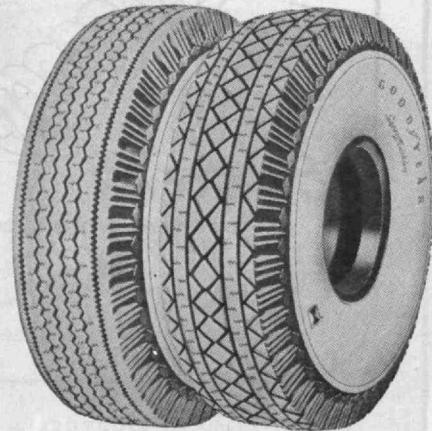
Super-Cushions make a small car feel like a big one. You seem to float in and out of traffic. And they make any car safer and easier to handle, especially on turns.

*Mileage?* In millions of test miles, Super-Cushions consistently averaged more mileage than the best standard tires!

Call on your Goodyear dealer today and find out how you can enjoy the advantages of Goodyear Super-Cushions on *your* car!



Till Goodyear produced Super-Cushions, lateral or crosswise shock had never been satisfactorily absorbed. Pillow-like Super-Cushions soak up lateral shocks, giving an unbelievably smoother ride.



The new *Super-Cushion* by **GOOD** *YEAR*

ALMOST LIKE  
FLOATING



# THE TECHNOLOGY REVIEW

TITLE REGISTERED, U. S. PATENT OFFICE

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY



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Editorial Associates: PAUL COHEN • T. L. DAVIS • J. R. KILLIAN, JR. • WILLY LEY • F. W. NORDSIEK

J. J. ROWLANDS • D. O. WOODBURY

Editorial Staff: THEODORA KEITH, RUTH KING

Business Staff: MADELINE R. McCORMICK

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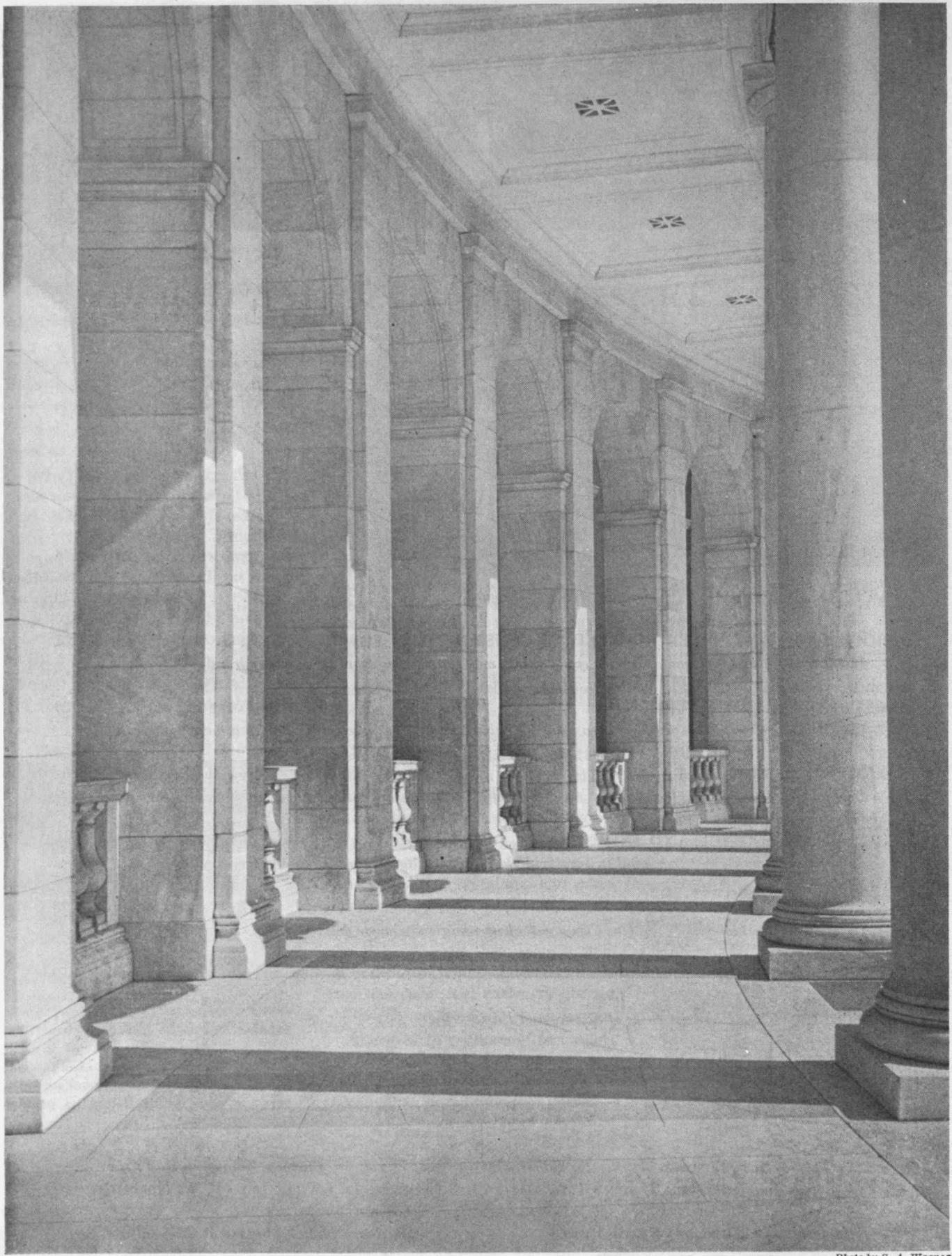


Photo by S. A. Wagner

#### **Pattern in Marble**

*Photography captures the texture and reflects the character of an architect's drawing in this photograph of a colonnade exhibited last summer in the Technology Photographic Salon.*

# THE TECHNOLOGY REVIEW

Vol. 50, No. 1



November, 1947

## The Trend of Affairs

Volume 50

**R**ETROSPECTION appears to be called for in inaugurating Volume 50 of The Technology Review. Ordinarily the simple imprint "Vol. 50" would serve to mark the golden anniversary of a publication and proclaim to its readers that a new half-century era was being ushered in. It is not until January 1, 1949, however, that The Review is entitled to celebrate the beginning of its fifth decade as a journal of science and engineering, edited at the Massachusetts Institute of Technology and serving M.I.T. Alumni. Volume 50 occurs earlier than The Review's half-century mark not only because the school year does not coincide with the calendar year, but also because changes in certain publication policies were required in Volume 25 when The Technology Review grew from a quarterly to a monthly periodical.

Earlier volumes record the progress of M.I.T. from "the Tech on Boylston Street" to the present overcrowded institution on the Charles River. Treated with alternate concern and pride are the problems and achievements of successive administrations under presidents James Mason

Crafts, Henry Smith Pritchett, Arthur Amos Noyes, Richard Cockburn Maclaurin, Elihu Thomson, Ernest Fox Nichols, Samuel Wesley Stratton, and Karl Taylor Compton. For 49 volumes The Review has rejoiced in the successes of its illustrious Alumni and sorrowfully recorded the passing of some.

The advancement of engineering education also looms large in past issues. In fact, one of the earliest articles was entitled "Methods of Teaching Engineering." Those with a nostalgic temperament will undoubtedly delight in the knowledge that the author of this thought-provoking article was C. Frank Allen, '72, who enjoyed celebrating his 75th anniversary as an M.I.T. alumnus on June 14 last.

When The Review first made its bow to a small group of readers there was already a community "groaning under an ever increasing weight of periodical literature" as the reproduced announcement reminds us. Now, as then, "The Review neither throws itself upon the charity of its friends nor prays them to be blind to its shortcomings." Now, even more than ever, "the Institute obviously stands in need of a clearing-house of information and thought, to increase its power, to minimize waste, to ensure among its

### The Technology Review

VOL. I.

JANUARY, 1899

No. 1

### ANNOUNCEMENT

To a community groaning under an ever increasing weight of periodical literature, a new magazine is forced to present itself in an attitude of apology. Like those college men with whom its interests are to be most closely bound, THE TECHNOLOGY REVIEW must make plain its purposes, its capacity, its determination to be useful, before it can expect to receive recognition from a public too busy to be indulgent. Realizing this, and mindful, too, of the spirit and traditions of the Massachusetts Institute of Technology, THE REVIEW neither throws itself upon the charity of its friends nor prays them to be blind to its shortcomings. Doubtless it will need indulgence, doubtless its attainment will fall much below its aspiration; but if it does not so far succeed in its attempt as to gain support through feelings other than those of simple friendliness, the existence of THE REVIEW cannot be too quickly ended.

Few appreciate how vast and complicated the interests of the Massachusetts Institute of Technology have become. With students, past and present, in every State, and in almost every part of the world, occupied in all manner of work and every civic duty; with studies of great range and courses of wide divergence; with always new and ever more complex problems of education crying for solution, the Institute obviously stands in need of a clearing-house of information and thought, to increase its power, to minimize waste, to ensure among its countless friends the most perfect co-operation.

countless friends the most perfect co-operation." We take pride in reaffirming: "Such a clearing-house The Technology Review purposes to be."

## Replenishing the Intellectual Flesh

TIME for reflection and for the development of a more rounded personality on the part of those engaged in scientific research was given new impetus by Charles A. Thomas, '24, in an address made this summer before the Industrial Research Institute, Inc. The highly specialized character of much of modern research has tended to departmentalize thinking of the individual into narrow, restricted fields, with consequent oversight or neglect of the significance of his work and its effect on the world's people. World War II has not only emphasized specialization in research but has added other detrimental effects which Dr. Thomas feels must be combated.

Physical destruction and moral disruption have brought about a serious decline in the field of science in European nations. The United States can no longer look to other nations, as it did in the past, for fundamentally new scientific knowledge — for the spark of an idea which American genius can blow, tender, and fan into a great fire. The originality and creativeness of American research must be stimulated to new heights if the gap created by the European decline is to be bridged.

The businesslike, highly specialized laboratory is an industrial necessity, but it does not appear to have provided that environment for bringing into being the basic scientific conceptions. There may have been so much formalizing and organizing of the laboratories as to bring about an overemphasis on equipment and facilities and an underemphasis of the men who are, after all, the creators. It is the men who make the laboratories, and not the other way around.

Many industrial scientists are depending on what might be termed their "intellectual fat," for under the stress of modern industrial living, they have no time to replenish their intellectual flesh. Nor does it seem that this criticism is directed specifically and alone to industrial scientists, at least for the present.

As one means of counteracting this deficiency of our industrial way of life, Dr. Thomas proposes that the more progressive key men in modern laboratories organize their programs and distribute their responsibilities to subordinates so that, at least for a period of a few weeks every year, they could absent themselves from their regular duties for personal development and exploration of stored-up ideas. Such time would be spent as the men wish — in libraries, in other laboratories, or in the comparative quiet and seclusion of the country. Such time should be reserved for their personal intellectual development in much the same way that the usual two weeks' vacation is customarily set aside for physical relaxation and development; it would be a period during which the accumulation of unworked but promising ideas might be investigated, fertilized, cultivated; from which, possibly, some beneficial results might be reaped. It would be a period for which the research worker would read the literature in his own and related fields; it should also be one for investigating foreign fields, so that these men may derive stimulation from the thinking which is being done in spheres with which they normally have little contact. In short, Dr. Thomas proposes for the research worker in

industry a "sabbatical leave of absence" which was once not unknown in the academic field for just such purposes, but which, unfortunately, seems to have lost much of its vogue under the pressure of recent events.

## Kudos for Teaching

PROFESSORS A. A. Knowlton and Clifford N. Wall have received honors of more than ordinary significance: for their outstanding undergraduate teaching of physics, respectively, at Reed College, Portland, Ore., and North Central College, Naperville, Ill. Bronze plaques and honoraria were presented to them last month on behalf of the Research Corporation of New York City by its president, Dr. Joseph W. Barker, '16.

Research Corporation awards for research were customary before the war. Such new international figures as Dr. Vannevar Bush, '16, and Professors Ernest O. Lawrence, of the University of California, and Percy W. Bridgman, of Harvard, received them. Two such awards for 1947 are to be presented this month for wartime accomplishments to Dr. Lee A. DuBridge, now president of the California Institute of Technology, and Dr. Merle A. Tuve, of the Carnegie Institution of Washington. The former, it will be recalled, was director of the Radiation Laboratory at M.I.T., and Dr. Tuve's recognition comes for his work at the Applied Physics Laboratory of the Office of Scientific Research and Development at Johns Hopkins University.

The special awards to Professors Wall and Knowlton, the former of whom is now on the faculty of the University of Minnesota, derived from studies made by Dr. M. H. Trytten for the National Research Council on the education of doctors of philosophy in the physical sciences. Two small institutions stood out for producing students who, after taking their bachelor of science degrees in physics, went on to compete successfully for the doctorate in that field; and further investigation at those institutions pointed to Professors Knowlton and Wall as the responsible inspiring teachers.

These two awards for teaching are notable, however, not merely because teaching accomplishment in the field of science — or, for that matter, in other fields — is marked less frequently by medals than is research accomplishment internationally or nationally. Instead, the awards direct attention upon the simple fact that research accomplishment depends primarily upon educating men to make it. Unlike the prewar days, no longer can we depend, for much of our technological advance, upon the fundamental scientific researches made in Europe. The memories of the recent years, when the instruction of students in scientific fields had to give way, possibly rightly, to military necessity, are too fresh to require elaboration here.

Large research laboratories are now in great favor by government, industry, and the universities. We talk of a National Science Foundation and \$80,000,000 a year for the support of research by government, in addition to the sums already spent for research by government and other agencies. Where are the really qualified scientists coming from to man these laboratories in the future? Obviously, they are to be developed as a result of the earnest efforts of teachers like Professors Knowlton and Wall, encouraged by understanding givers of kudos such as the Research Corporation.

## Atomic Power for Industry

ESTIMATES vary as to the time when engineers can put into practical application, in the building of plants for the production of atomic power for industrial use, the knowledge painstakingly being gained by physicists. No less authority than David E. Lilienthal, chairman of the United States Atomic Energy Commission, has made the statement that the industrial exploitation of atomic energy could not be expected in the near future. Nevertheless, the problem continues to receive every possible consideration, as it has by competent scientists long before the public became aware of the importance of atomic power.

Indicative of the widespread importance of this project, and of this country's desire to advance as rapidly as possible the industrial potentialities of atomic power, is the recent appointment by Mr. Lilienthal of a group of seven outstanding industrial leaders to serve as a board of consultants for the Atomic Energy Commission. Charged with the responsibility to speed up the industrial opportunities in the field of atomic power, the new board of consultants includes the names of Donald F. Carpenter, '22, Vice-president of the Remington Arms Company, and Robert E. Wilson, '16, chairman of the board of Standard Oil Company of Indiana. The board is to serve as a means of contact between the Atomic Energy Commission and creative thinkers in this country and, indeed, throughout the world. Emphasis is to be placed on the full use and development of the initiative and inventive genius of private enterprise.

## Ideal By-Product

WASTE materials from food processing may be either a liability or an asset to the processor. Food wastes are liabilities when they are discarded; haulage for dumping is costly, and direct discharge into the local sewerage may be forbidden or may be permitted only at the price of monetary penalties. Such restrictions are necessary because industrial wastes are much more concentrated than is domestic sewage, and correspondingly overtax municipal sewage disposal facilities. For example, on the basis of biochemical oxygen demand, suspended solids, and nitrogen content, 139 food-manufacturing plants located in the sanitary district of Chicago discharge wastes equivalent to the sewage resulting from more than 1,800,000 people — a population nearly half as large as that served by the sanitary district.

But the wastes of food processing become assets when they are treated (usually dried) so that their nutritive or other values are salvageable. Unfortunately, however, equipment for by-product processing is costly, and obviously returns from the sale of by-products must support this investment. A single plant may not produce enough of the by-product to justify waste-processing equipment. In this situation the waste material may be collected, as by means of tank trucks, for processing at a central point. Examples of this procedure are the collection of whey, from scattered cheese factories, for drying, and the collection of yeast, from small breweries, for debittering and drying.

Industries, such as those of fruit and vegetable processing, that operate only a short time each year, have difficulty justifying investment in by-product processing

equipment, because such equipment is idle during the large proportion of each year when these plants are closed.

The background information just outlined shows why one recently developed by-product — tassels from the growing of hybrid seed corn — may be characterized as "the ideal by-product." Dried corn tassels are valuable not only as an adjunct to poultry feeds, wherein they serve as a source of protein and vitamins, but also because they may be processed in equipment always found on seed-growing farms, and otherwise idle at the time when tassels become available.

Hybrid corn is designed to take advantage of the genetic characteristic known as "hybrid vigor"; it is the first generation cross of two inbred strains. To produce the seed, two rows of plants that serve as male parents are planted alternately with six rows of plants that function as female parents. Cross-pollinating is done by hand; to prevent self-pollination the tassels must be removed from the female functioning plants before pollen begins to shed. Production of hybrid corn seed in the United States is so extensive that approximately 50,000 tons of tassels, dry basis, are available annually.

To produce a nonputrescible, marketable product, corn tassels must be dried. But seed corn also is dried before distribution, and the seed driers available on all seed-growing farms are idle during the detasseling period. These driers are entirely suitable for tassel drying. Extensive analyses of corn tassels by one of the Federal Government regional research laboratories have shown that tassels have even higher protein content than has whole grain corn, and are rich in vitamins of the B complex and in carotene (the precursor of vitamin A). Furthermore, these studies showed that the tassels have higher nutritive value at normal detasseling time than earlier or later. Thus, corn tassels, dried and sold for use in poultry feeds, have become an asset instead of a liability to seed-corn growers, and are in fact an ideal by-product.

## Techni-Topics

OF COMPARATIVELY recent origin is a projection cathode-ray tube for demonstrating before groups of persons the intricate traces of electric phenomena seen on the fluorescent screen at the end of the oscilloscope tube. Such a projection tube has considerable potential application in the classroom where electrical phenomena can be seen simultaneously by scores of persons instead of perhaps half a dozen as is true with direct-viewing tubes. The educational possibilities of the tube are easily demonstrated by combining the image from it with that of a set of orthogonal axes from an auxiliary projector. The two simultaneously projected images provide a means for representing time varying phenomena in three dimensions. By means of special signal voltages, applied to the deflecting plates of the cathode-ray tube and combined with the usual scanning signals to displace the electron beam, an illusion of traveling waves in three dimensions may be clearly depicted. No doubt considerable development work still remains before the underlying principles can be applied generally to the three-dimensional representation of electromagnetic radiation, mechanical stresses and strains, and other space phenomena which are difficult to visualize. Nevertheless, the possibilities of such a system for (Concluded on page 64)



*Drawing from Fairchild Aircraft*

# Progress in Air Power Related to

**I**N the pioneer days of flying, when airplanes were little more than powered kites, the selection and development of airfields were simple problems and exercised little influence on the newborn technology of flight. For the Wright brothers' first successful venture, the sandy beach at Kitty Hawk was eminently satisfactory and construction effort was limited to the removal, by hand, of some minor debris which, otherwise, might have interfered with the landing gear of the plane.

## *Balance of Power, World War I*

Even with the advent of the military use of airplanes in World War I, the development of areas from which to fly remained a relatively minor factor in the application of air effort. Airfields were developed merely by improving flat well-drained sites by hand labor at a relatively small expenditure of man-hours, materials, and other construction means. Similarly, during World War I, practically all road construction and repairs were accomplished with hand tools. However, in the years just preceding World War II, the enormous strides made by the automobile industry in the design and mass production of trucks in unprecedented numbers, created a situation wherein motor transport became out of balance with the development of road-construction machinery. Under traffic of hitherto unheard of weight and intensity, roads repeatedly became bottlenecks over which long, congested columns of troops, transport, and impedimenta crawled and bogged down while engineer troops toiled and sweat to quarry, hand place, and hand spread sufficient rock. It is significant, therefore, that mobility was lost to the armed forces and a static war of attrition on a fixed front resulted.

## *Expanding Construction Power*

The period between World War I and World War II was marked by rapid technological advances in many fields. Within the construction industry there ensued a tremendous impetus in the design and manufacture of

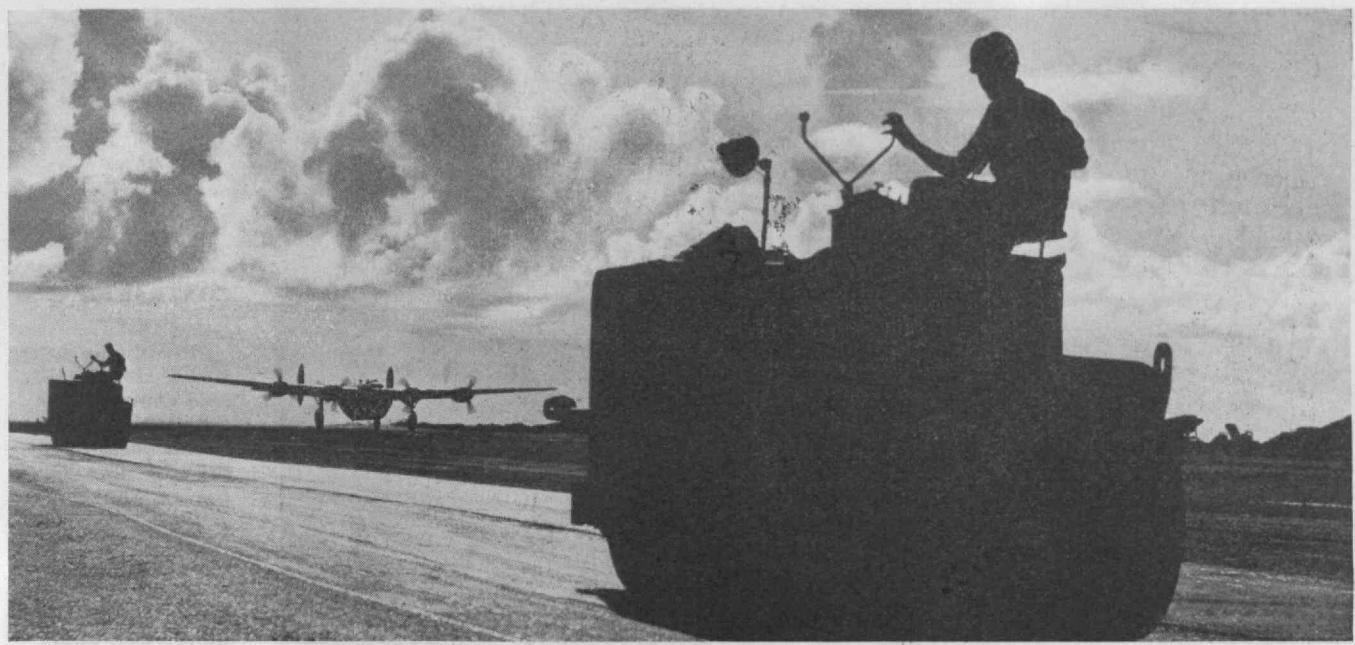
construction machinery, which arose primarily from the public need for high-speed, all-weather highways to support the growing volume of motor vehicle traffic. This construction machinery, created primarily to build our national road net, greatly facilitated the construction of levees, dams, waterways, power installations, and flood control works, the cost of which, on a broad scale, had been prohibitive in the past. By the development, during this period, of the bulldozer, the Diesel-powered shovel, motor patrol, and similar equipment, the cost of such construction was reduced to from one-third to one-fourth of its cost prior to World War I.

This advance in the design of earth-moving machinery had another application in making feasible the construction of commercial airports which were required to support the expanding aircraft industry. Because they appreciated the capacity of the construction industry to create strong and durable pavements, aeronautical engineers were able to proceed with the design of increasingly heavy aircraft, knowing that runways would be made available to support them. Yet, between the two World Wars, only the most visionary engineers could have foreseen the far-reaching effect which the commercial development of construction equipment would have on the ascendancy of air power during the conflict to begin during 1939.

At least a few persons realized the extent to which air power depended on construction power. In a book written about the Air Force just prior to World War II,\* General Henry H. Arnold, the wartime commander of the Army Air Forces, and General Ira C. Eaker, pointed out that air

*That aeronautical engineering is already influenced by problems in the construction of airfields, rather than by aerodynamic factors alone, is indicated by the experimental Fairchild Packet, C-82 (above) whose track-type landing gear is designed to distribute the load of the heavy plane on the ground.*

\* *Winged Warfare* (New York: Harper and Brothers, 1941), \$3.00. See Chapter 3.



Official Photo U.S.A.A.F.

# Construction Power . . . BY WILLARD ROPER

power depended on three major factors: (1) a high type of personnel; (2) the airplane as a weapon; and (3) air bases from which to fly. As the concept of air power grew during the years immediately preceding World War II, it became increasingly evident that air bases would be needed in vast numbers; air bases which could be constructed rapidly and yet be large and heavy enough to support the heaviest airplanes then contemplated and with facilities to provide for repair, refueling, and bomb loading, as well as for the housing of the crews required to fly and to service the aircraft.

Thus it was that in 1940, at about the same time that President Roosevelt called for manufacture of 50,000 military aircraft annually, the Air Force organized the 21st Engineer Aviation Regiment at Langley Field, Va., to serve as the pilot model for many similar air-base construction units to follow. The organization of the regiment was based on concepts developed by the Chief of Engineers, United States Army, for the application of commercial construction equipment to military usage. Although the equipment then selected was considered by military leaders to be extremely heavy for military use, it developed later that even heavier types were needed. As a consequence, for example, R-4 and D-7 tractors gave way to D-8's; three-eighths-yard shovels were

replaced by three-quarters- and one and a half-yard; one and a half ton dump trucks gave way to four-ton trucks and 12-yard tourna-trailers. These changes in equipment evolved during the war years as airplanes increased in size from that of the B-18 through the B-17 and B-24 to the B-29, and gross weights rose from less than 35,000 pounds to more than 130,000 pounds.

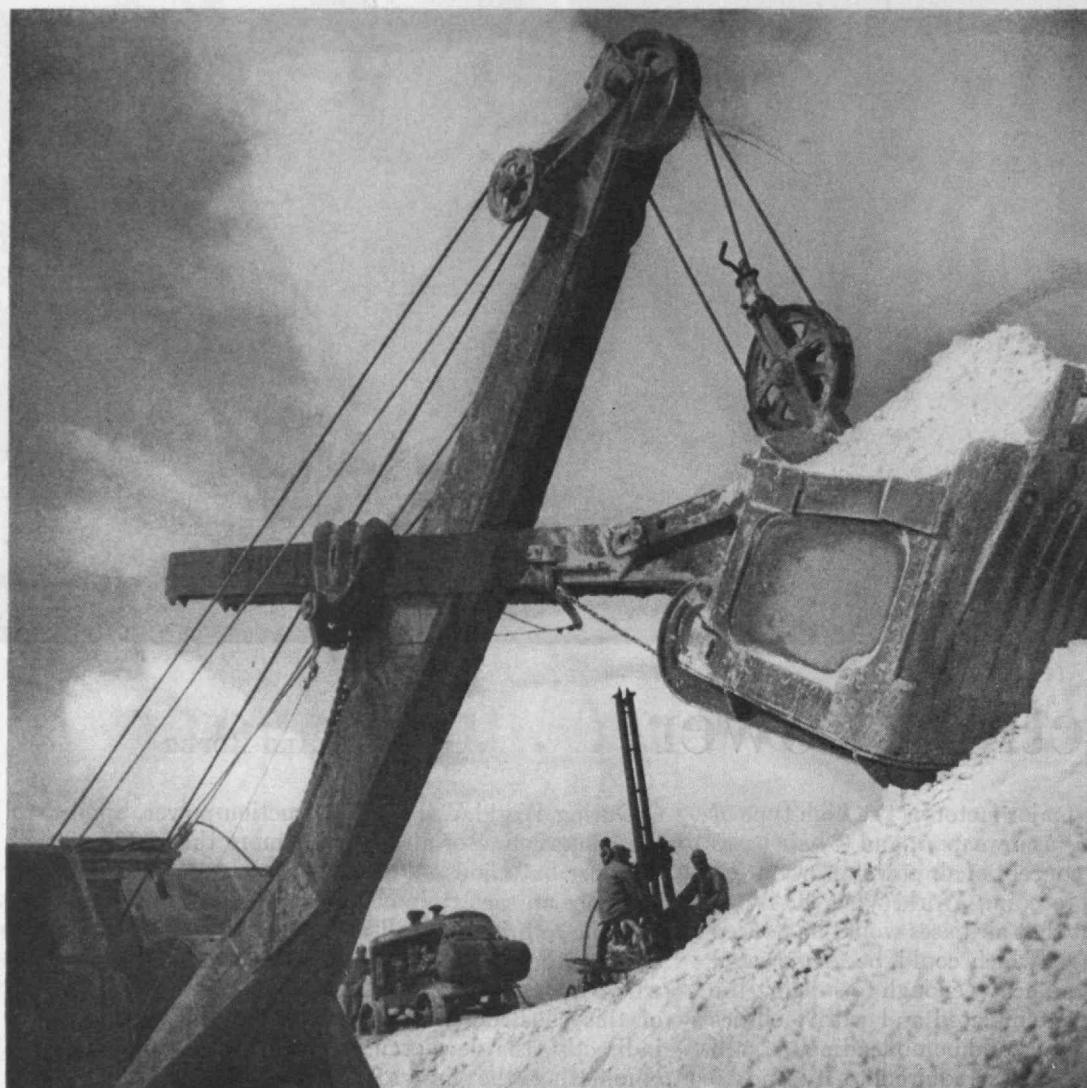
*As a B-24 Liberator returns to base, aviation engineers roll the asphalt in preparation for the arrival of a fleet of B-29's (above). The degree to which future progress in aeronautics depends on advances in construction engineering was amply demonstrated by large bomber operations during World War II.*

During World War II, construction power, applied to the construction of air bases by more than 100 aviation engineer battalions all over the globe, exerted a marked influence on the attainment of final victory by making it possible to bring the full weight of our air power to bear against the enemy rapidly and effectively, when and where it was needed most. A somewhat less evident effect of this construction power was that it made possible, indirectly, the development of very heavy bombers by eliminating the limitation normally imposed by the strength of runway pavements.

## *Balance of Power, World War II*

Conversely, one of the principal reasons for the failure of the Japanese to develop heavy bombers, was their lack of construction machinery to create, rapidly, the runways necessary for the support of heavy aircraft loads. It is interesting to note that among the messages sent by General MacArthur to the Japanese authorities, after initial armistice terms had been dictated, was a directive for the Japanese to provide 10 motorized road graders at Atsugi airdrome coincident with the arrival of initial airborne elements of our occupational forces. The Japanese respectfully replied that it was impossible for them to comply with this particular order as there were known to be in operation only three such graders in the entire Japanese Empire and these were not of the self-propelled type. Even the Germans, with their technical skill, lacked the heavy military construction forces necessary to support a modern air force, and the lack of sufficient heavy air bases, when and where needed, was an important factor in the defeat of the Luftwaffe.

Air-base construction power during World War II manifested its support of United States forces in several different ways. First, it permitted the development, within amazingly brief periods of time, of vast numbers of fighter and transport airfields in support of fast-moving, tactical situations. During the campaign which began



CONTRAST IN ...

*Hundreds of powered shovels were transported to island bases during the war for use in the construction of air bases. Ranging in size from one-half cubic yard to two cubic yards, such shovels were larger than construction equipment previously used.*

*Photo by Army Air Forces*

with D Day in Normandy and ended with V-E Day in Berlin, the Aviation Engineers of the Ninth Engineer Command put into operation on the continent of Europe a total of 250 air bases—an average of one every 36 hours. This network of air bases permitted rapid forward deployment of tactical air power in support of the ground armies and, when used additionally for supply and evacuation, made possible such spectacular mechanized advances as that of General Patton's Third Army.

A second type of construction operation which contributed greatly to the advancement of air power was demonstrated in Burma where air-borne aviation engineers landed behind Japanese lines and there developed air bases which advanced the combat lines by hundreds of miles without recourse to long, arduous, and costly jungle campaigns. This same type of operation was utilized to advance our forces along the north coast of New Guinea and through the islands of the Central and South Pacific, except that movement of the construction forces was accomplished by sea instead of by air. The by-passing of large Japanese garrisons would never have been feasible, had it not been for our ability to construct highly developed air bases rapidly at the point of amphibious landing.

The third, and in many ways the most impressive, type of construction undertaking was the development of massive air bases for the support of B-29 operations

against the Japanese homeland. Because of its size and weight, the B-29 demanded unprecedented efforts in air-field construction. Its wheel load was 67,500 pounds to the Liberator's 33,900; its gross weight, 135,000 pounds to the Liberator's 67,800. It required a runway 200 feet wide and 8,500 feet long—an area almost twice as great as the 150 by 6,000-foot strips used by Liberators. Other base facilities were in the same proportion. At Saipan, for example, the final stage of development called for two parallel runways with 150-foot shoulders; six miles of taxiways 60 feet wide; two 300 by 1,950-foot service aprons (each as large in area as many fighter strips used in the early days of the war); 180 hardstands, 140 feet in diameter, and 390,000 square feet of warm-up aprons. For this construction about 30,000,000 square feet of land was cleared and graded and, of this area, about 10,000,000 square feet was paved. In addition, gasoline storage for 188,000 barrels of aviation gasoline was required; also required were ammunition storage for 20,000 tons of bombs and all facilities to accommodate the 16,000 individuals who made up the ground and air crews. Despite the vast size of this project, some idea of which may be obtained from the statistical data in Table I (page 28), the base was made ready for the arrival of B-29's, through the efforts of four engineer aviation battalions, within 114 days after the assault landing.

## ...CONSTRUCTION

*In China, where manual work replaces mechanization, construction is slow and costly. The tops of conical towers of earth indicate the original surface of the ground, and were used as a yardstick to compute the amount of material excavated.*



Official Photo U.S.A.A.F.

The achievements of American construction power are highlighted by comparing this project at Saipan with another project which was nearing completion at about the same time in China. There, under American supervision, a staging field was built by Chinese labor for the refueling of India-based B-29's en route to Japanese targets. Without any modern equipment, a construction force was organized to include 60,000 workers hauling baskets of gravel a distance of eight miles; 35,000 more workers crushing stone with hand hammers, and another 5,000 workers pushing wheelbarrows. As many as 200,000 baskets were brought into use at one time, slung on carrying sticks which were bent almost double as the men, and women, worked 12-hour shifts. Even at the prevailing wage rate of \$0.11 per day, construction of air bases by these methods was expensive and exasperatingly slow.

### Future Trends and Limitations

The kind of construction power which gave the Army Air Forces mobility and striking power during World War II was applied in behalf of the ground Armies and the Navy with equal effectiveness. Roads, bridges, railroads, ports, depots, and repair facilities were constructed rapidly in support of our forces in all parts of the world and gave to the Army and Navy flexibility, speed, and power which were impossible of attainment during World

War I. The unbalanced condition of the earlier conflict had given way to one wherein construction capabilities were equal to the task of supporting mobile forces.

Future trends in requirements for construction support of air power can be predicted only with limited accuracy. However, it appears that a point may be reached where air power will be threatened by a new limiting factor, namely, the ability of the civil engineer to support, on the ground, the heaviest aircraft which the aeronautical engineer can support in the air. When airplanes are designed that cannot be supported by runway pavements without enormous outlays of money, man power, materials and machinery — and especially time — then the design of airplanes and the design of airdromes will be out of balance. If a solution is not found, the future mobility and flexibility of air power itself will then be threatened. The development of the B-36, with a gross weight of 300,000 pounds, has given rise to many difficult construction problems; yet even heavier aircraft are in the offing. Aircraft manufacturers believe that the man-hours per pound required to construct an airplane, and the cost per ton-mile to haul pay load, are still on the downward trend with aircraft weighing up to 800,000 pounds.

From the results of recent pavement tests, it is estimated that reinforced concrete pavement, 20 inches thick, will be required to support B-36-type operations.

**TABLE I. AIR-BASE CONSTRUCTION AT SAIPAN**

*Over-all Construction Data Covering Total Work of Engineer Aviation Battalions, Saipan*

June 26, 1944 — February 1, 1945

EARTH MOVING: Grand Total	4,433,815 cu. yds.
By carryall scrapers and bulldozers	1,387,817 cu. yds.
By Tournapull	675,785 cu. yds.
By dump trucks (earth)	186,882 cu. yds.
By dump trucks (base coral)	2,102,831 cu. yds.
By dump trucks (asphalt)	80,000 cu. yds.
Coral surfaced areas	3,866,680 sq. yds.
Paved areas	11,000,000 sq. ft.
Building construction (floor space)	1,053,774 sq. ft.
Bulk aviation gasoline (storage capacity)	7,919,000 gals.
Pipe line, aviation gasoline	62,083 ft.
Asphalt produced	127,332 tons
Portland Cement poured	4,142 cu. yds.
Oil or cutback asphalt laid (as dust palliative)	379,648 gals.
Aggregate produced	31,273 cu. yds.
Coral quarried (other than from runways)	2,326,970 cu. yds.*
Explosives used	861,000 lbs.
Mogas fuel consumed	1,721,439 gals.
Diesel fuel consumed	1,349,828 gals.

\* Difference between this figure and total coral hauled was furnished individual units for their own construction.

**TABLE II. COMPARATIVE COST OF CONCRETE FOR HEAVY BOMBER AIRFIELDS**

Type of Aircraft	Square Yards of Concrete Required	Barrels of Cement	Cost to Put Concrete in Place
B-24	233,300	87,486	\$ 691,000
B-29	515,846	257,922	2,217,000
B-36	933,100	466,549	5,759,000

Cost figures are for concrete to build one runway, taxi way, apron, and hardstands, and do not include costs of any housing, bomb storage, sewage disposal, water and gas storage, hangars, or other facilities which, for a B-29 wing field, are comparable in size to a city of 16,000 population.

**TABLE III. CONCRETE REQUIREMENTS FOR A B-36 AIRFIELD**

	Tons	40-Ton Rail-road Carloads	Four-Ton Truckloads
Cement	93,309	2,332	23,327
Sand	186,619	4,665	46,654
Aggregate	373,239	9,330	93,309
Totals	653,167	16,329	163,291

With 45 four-ton trucks per battalion, each hauling 10 loads per day, it would require 362 days or one year to move the concrete alone on a one-runway B-36 airfield.

Furthermore, partially stabilized runway shoulders will no longer suffice since, if a heavy bomber of the B-36 type rolls off the pavement, even when taxiing, serious damage is very likely to result. Table II gives some indication of the relative cost of building a single runway air base for B-36, B-29, and B-24 aircraft, although only costs pertaining to concrete are shown, and costs pertaining to grading, base course, and other airdrome facilities have been excluded. It is apparent that the cost of pavement

only, for a B-36 field, is approximately nine times the cost of a similar B-24 installation and two and a half times that for a B-29. From a military standpoint, however, even more important are the logistical difficulties which would be encountered in construction of such a base in time of war. From Table III, which shows the weight of materials involved for concrete pavement only, it may be seen that 20 Victory ships would be required to move the cement alone in constructing a single runway for B-36's. Therefore, the practicability of effecting rapid construction of B-36 air bases by current methods in time of war is at least open to question.

It is certain that a solution to these problems must, and will be, found. We may wish and hope that very heavy bomber bases could be restricted to the United States. Still, the natural tendency to push air bases as far forward as possible, in order to be within fighter-escort range or to drop more bombs more frequently, would be experienced in any future conflict, just as it was manifested during World War II. In solving our present difficulties, however, a situation is encountered which is quite different from that which existed after World War I. This important difference is the lack of a nationwide economic impetus for developing heavier construction machinery and methods to produce surfaces for high-speed traffic loads, such as is imposed by the B-36.

**Track-Type Landing Gear**

One solution appears to lie in the development of landing gear which will provide greater load distribution and hence permit operations from less highly developed surfaces. Multiple wheel landing gear, that is, twin, twin-tandem, and spaced-tandem arrangements, afford some measure of relief but add additional weight to the aircraft and are subject to limitations imposed by tire design. Tire inflation pressures up to 170 pounds per square inch are now used in some of the newer aircraft and possibly these may be raised to 300 pounds per square inch. The effect of such inflation pressures, however, will be to cause extremely heavy damage to all but the highest type of pavement surfaces.

Recently the caterpillar type track, commonly used on tractors, tanks, and half trucks, has been adapted, experimentally, for use on aircraft. A continuous, smooth, outer-surfaced belt, rolling on, and supported by, suitably spaced bogies assembled into a landing gear already has been used successfully on an A-20 light bomber and is being tested on a C-82 Fairchild Packet. With this gear, test runs have shown the feasibility of landing, taxiing on, and taking off from ground which would bog down any standard gear. Utilization of this type gear would greatly simplify the problem of effecting air-borne landings in hostile territory and, if applied to the very heavy aircraft of the future, would reduce air-base construction requirements enormously.

In the initial stages of development, it appeared probable that the flexibility of the belt of the track landing gear between bogies would make the gear inoperative on hard surfaces; a condition which might well have revolutionized pavement design. That is, an airplane so equipped was able to land on a soft field, but could not land safely on a hard one. Recent design changes indicate this limitation probably can be removed, thus permitting airplanes with track-type gear to operate from existing hard-surfaced runways. However, (Concluded on page 58)

# Research for Education

## *Advancement of M.I.T.'s Educational Objective Is Primary Factor Governing Acceptance and Priority of Sponsored Research*

BY JAMES R. KILLIAN, JR.

**R**ECALLED by all is the "long hairs vs. hairy ears" argument that followed World War II, and the repeated assertion that men trained in science, especially in physics, proved to be more effective at applied research than did the engineers. No doubt this assertion, if analyzed, can be shown to be a half-truth. Nevertheless, the half-truth that remains should force and is forcing a re-examination of some of our methods and procedures in engineering education, and of our use of research as a method of teaching.

The scientists ascribe their success in handling applied research during the war to several factors: The first is that they had advanced training and most of them held doctor's degrees. The second is that they had a fundamental training in science that was both broad and deep, with the result that they were able to bring to bear upon practical problems a wide range of scientific learning and a flexible method of thinking. The third is that the training which they had received and the environment in which they had worked promoted creative thinking of a quite untrammeled kind. They were not normally concerned by any practical or economic limitations and they were instinctively inclined to dream and speculate, with a bold indifference to limitations. Such unusually favorable conditions for research have seldom occurred before.

Now this kind of training and this point of view are not a monopoly of the scientist, and there are fields of engineering which have embraced them for many years. The fact remains that engineering, while retaining its capacity to work under practical limitations, must at the same time adopt more of the analytical tools of pure science and its willingness to question standard practice. The feeling is widespread in many institutions that research must be used throughout our engineering training to attract men of imaginative minds and to train engineers who have the temerity and capacity to dream and speculate beyond the boundaries of the immediately practical.

The engineering departments at M.I.T. have long been wedded to the principle that research and the research atmosphere are essential to the training of both undergraduates and postgraduates and that a balanced staff must involve creative competence as well as teaching competence. No doubt this tendency to deepen engineering education through stressing fundamental research is one of the most important changes now in process. While engineers must always maintain their firm hold on the economic and applied aspects of their art, they can enormously benefit by promoting within their ranks an increasing number of scholars with the courage to ignore conventional conceptions and with a comprehensive understanding of physical laws and analytical methods.

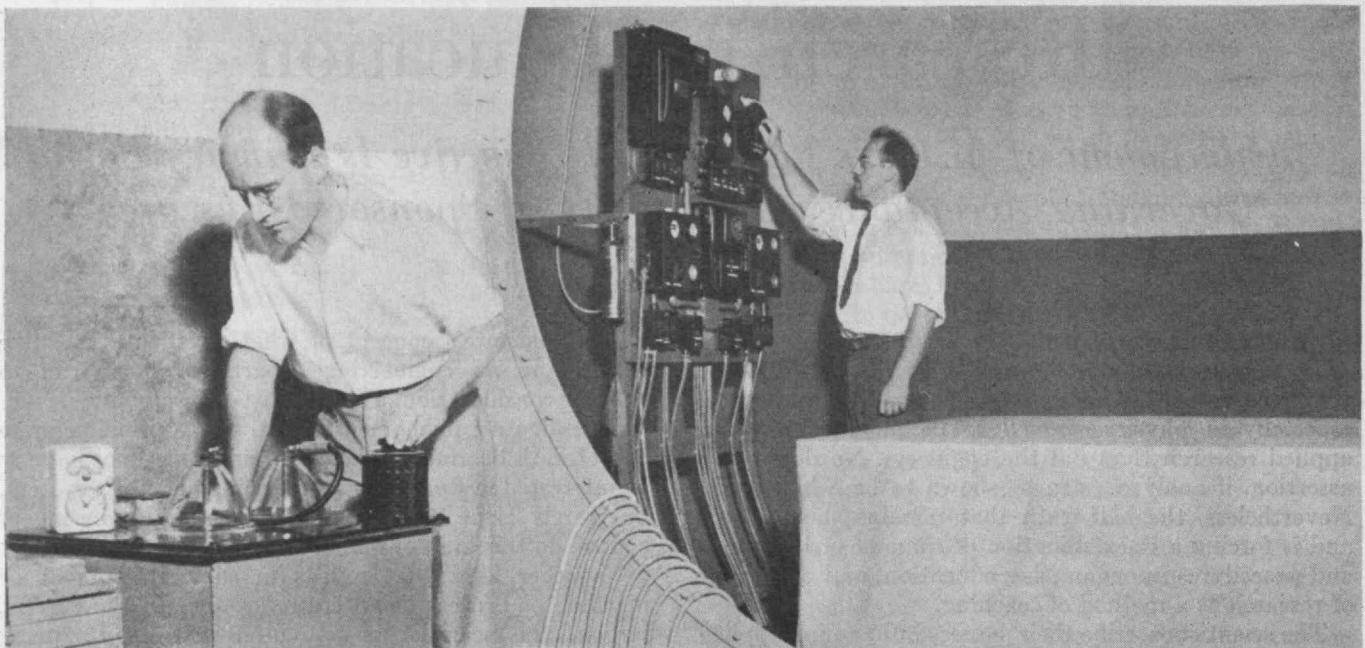
The Institute's concept of what constitutes effective research in an engineering department is subject to another consideration. The scientist generally undertakes to investigate a phenomenon or to seek a principle or to collect data bearing on a hypothesis. Sometimes he may be interested in working on some component of a system, but rarely is he interested in a system. Engineers, of course, do this kind of research, too, but frequently they do another kind that results in some instrument or machine or process or an entire system. In the current jargon, the scientist is not interested in producing "hardware"; the engineer frequently is. Is there a real danger that too much emphasis on hardware may reduce the effectiveness of engineering research in an educational institution?

### *The Problem of Hardware*

We have been trying to clarify our own thinking as to when hardware, or the design of some entire engineering system, does provide a justifiable research objective. We have concluded that if the hardware involves some new art and there is a great demand for men adequately trained in this art, then this kind of research can be vital. The field of control (including servomechanisms), may be cited as an example of an engineering art that is still under intensive development. Research in this field not only must look toward the production of an instrument as the end result but must comprehend an entire system, since the assembly and balance of the system is one of the essential research problems. There is a great need for men who are trained in the art of developing dynamic control systems, and consequently any laboratory activity must deal with the over-all system.

This emphasis on system research in the control field justifies another type of research which might commonly be out of place in an engineering institution, that is research which involves the production of equipment. In control, and a few other fields, because of the importance of the systems aspect, the production of equipment involves a new art and a research technique which is essential in training men in the field at an advanced level. There is no way for these men to become effectively trained other than to work on a project which involves the production of control units. More importantly a systems project or the engineering of a piece of equipment can be an extraordinarily effective educational vehicle by requiring a synthesis of all that the student has learned.

At M.I.T. we believe that research or hardware or systems should meet these tests of educational validity. With these exceptions in mind, we believe that engineering research in an educational environment can be most effective when it is handled on a component, or unit,



Using the Van de Graaff electrostatic generator developing potentials of several million volts, studies of x-rays in various fields, and of the atomic nuclei, are representative of research projects at M.I.T. conducted primarily to advance knowledge. Shown here is the interior of one of the huge spherical terminals of the Van de Graaff generator with control panel in the background.

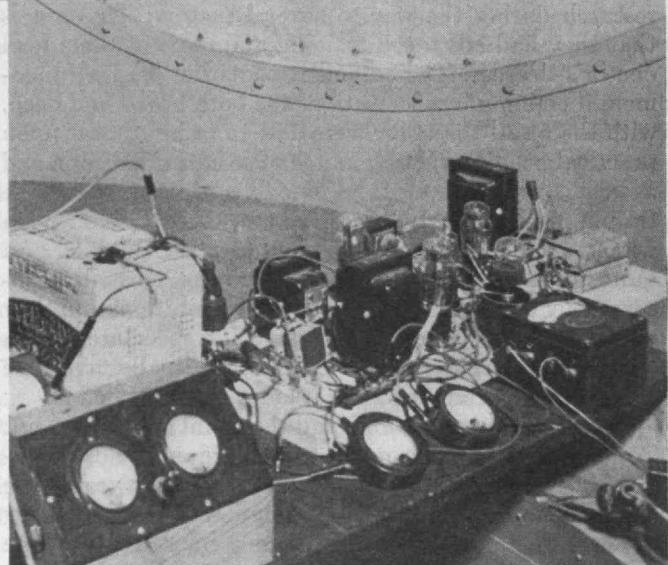
basis and when it is concerned with principles and a fundamental search for knowledge rather than production of hardware.

#### *The Organization of Academic Research*

Another problem that has required much attention is the management and organization of research, especially that kind of research which is carried on by large groups of investigators. The war demonstrated the effectiveness of research teams, and the Institute is now experimenting to determine how effective group research can be within an academic organization. In this experiment, we are certain that research teams should never displace the brilliant individualist who works alone, but we want to find out how the two approaches supplement each other.

One of the devices employed at M.I.T. to handle group research — and to stimulate individual work — is the "center of research" of which several are in operation. These are interdepartmental organizations which coordinate the co-operative activities of various departments in important fields of overlapping interest. While we call them centers of research because research is their predominant role, they are nevertheless playing a very important part in our educational program, especially by providing superior opportunities for senior and graduate student thesis work.

These centers of research appear to be a highly satisfactory answer to a problem which has long confronted educational institutions, namely, that of handling those interests which reach outside the traditional departmental boundary lines and require the co-operation of the specialists from several disciplines. Certain institutions have tried to meet this problem by setting up special institutes. Others have set up new departments. It is the feeling at M.I.T. that both of these solutions seem to be lacking in two desiderata: namely, the mobilizing of the



interested personnel of the various departments into a co-operative whole while still recognizing each department's special interest in the various aspects of the program, and, most importantly, the full co-ordination of the research with the educational program.

Centers of research have been established in about half a dozen fields, but the first and the most highly developed of such programs is in the Research Laboratory of Electronics, which is operated jointly by the Department of Physics and the Department of Electrical Engineering. Some 65 graduate students are now doing their theses in this laboratory. It has a highly productive program of research that is managed by professors from the two collaborating departments and it maintains a concentration of equipment which is available to the staffs of the two departments.

We believe that this laboratory is serving as a pilot plant for a new type of internal collaboration among departments having the fundamental scientific point of view and departments having the applied point of view. Through such mechanisms as this we hope to effect a fruitful cross-fertilization and thus minimize the dif-

ferences which distinguish the engineer and the scientist. Joint laboratories of this kind also provide a means whereby the educational staff can cope with large-scale sponsored research. These laboratories provide a staff of administrative officers and services which free the educational staff from routine work, thus permitting them to concentrate on their educational and research activities.

### **Contract Research — Its Values and Limitations**

Coming now to some of the special problems of sponsored, or contract, research, there are several guiding principles which have been laid down at M.I.T. and this article describes some inherent difficulties.

The first of these guiding principles is that the primary purposes of an educational institution are to educate men and women and to increase knowledge, not to compete with industry in industrial research or production for profit or to undertake activities which are the special responsibility of governmental agencies. Two factors may justify a secondary activity in the realms of these industrial or governmental interests: One is the importance of case material in any effective professional education. The other is the responsibility of an educational institution to render public service when it can do so without impairing its primary functions and when its personnel, facilities, or experience especially qualifies it to perform a needed service which cannot be performed adequately or in time by some other agency.

Our second guiding principle is that sponsored research should be closely related to the normal program and recognized objectives of the institution. It should involve only work which can be carried out with enthusiasm by the staff and it specifically should not be work which the staff would undertake with reluctance and which would be unrelated to their educational and professional programs. A member of the Institute's staff is never "assigned" to contract research.

The third guiding principle is that imposition of restrictions on publication of research results, either for secrecy or patent reasons, can become incompatible with the basic concept of an educational institution as a source and distributor of knowledge. Research contracts involving such restrictions, especially long-term or permanent restrictions, should be undertaken only for exceptional or emergency reasons. No arrangement is permitted which could inhibit free and effective work by the institution in any scholarly field. No project is normally accepted unless it is open to qualified students.

Our fourth guiding principle is that the compensation and privileges available to the academic staff, including graduate students who are members of the staff, must never suffer in comparison with the emoluments available to staff engaged solely for contract research. This policy is of the greatest importance, since funds available for contract research frequently are less restricted than funds available for the regular academic program, and there is a consequent temptation to pay higher salaries to the personnel working on these projects.

The Institute has carried out this policy of protecting the academic staff by distinguishing sharply between the academic staff, with its educational function, and the nonacademic staff employed specifically for contract research. The academic staff has important privileges, such as tenure, membership in the pension association,

opportunity for graduate study, time for outside consulting, and extended vacations. None of these privileges is available to the nonacademic staff.

The compensation for nonacademic staff, however, is usually somewhat higher than are salaries of comparable academic appointees. In securing staff for research projects, we have had to meet industrial competition in recruiting, and their status with us is quite comparable to what it would be in industry.

The same general policy applies to graduate students who have part-time staff positions. The nonacademic staff member who wants to take graduate work is limited to one subject per term and he may not present a thesis based upon sponsored research work for which he has received compensation at a higher rate than that available to the academic appointee. In contrast, the regular graduate student who also has an academic appointment as teaching fellow or research assistant receives a lower rate of pay but has full graduate student privileges, including the opportunity to work on sponsored research and use this work for thesis credit, provided of course it has been approved and properly supervised.

Maintenance of these two rates of compensation requires some dexterous tightrope walking, but we have demonstrated, at least to our own satisfaction, that it can be done. In practice, the Division of Industrial Cooperation, which manages the Institute's sponsored research, gives preference to the academic staff when it is recruiting personnel for a contract project, but if the project cannot be staffed from our academic group, appointments from outside the Institute are made in accordance with the policy outlined above. Even though the salary scale may be somewhat lower for the academic staff, the academic appointment with the privileges it carries remains a more desirable appointment.

Related to this general policy is our limitation on supplementary compensation to academic staff members who work on contract research. Here we follow the policy that teaching and other normal academic duties must not be made less attractive than working on contract research. We share fully in the following recommendations of the Committee on Academic Tenure, Professional Service and Responsibility of the Engineering College Administrative Council:

"If equity demands that supplementary compensation should be paid for extra work within an institution, the amount of such additional compensation should not be so high that it tends to reduce the importance of the staff member's regular work and salary, and to place a value on contract research or nonacademic assignment that is high in relation to the value placed on the usual academic duties.

"Care must likewise be exercised to avoid compensation inequities within an institution which result when some staff members, whose field of work may attract outside research, receive large supplementary salary payments while other staff members, in fields of less immediate application, but possessing equal or greater scholarship and professional standing, receive from the institution only their regular salaries. No plan of supplementary compensation should put teaching in an inferior position or tend to divert staff members from their obligations to their students."

In practice, staff members working on sponsored research have enough time released (*Concluded on page 60*)

# Oxygen for Industry

## New Processes Making Possible Large Production, High Purity, Low Cost, Pave Way for Increased Industrial Uses for Oxygen

BY EARL P. STEVENSON

**O**XYGEN is not only the most abundant and the most vital of all elements, but historically its identification and simple reactions mark the birth of modern chemistry. The industrial separation of pure oxygen from the air in the early years of the Twentieth Century was a milestone in chemical engineering and provided a most valuable tool for the metal-working industries. World War II witnessed a renaissance in the study of methods of producing oxygen which promises to broaden its use in customary applications by reducing the cost of oxygen and, perhaps even more important, to permit for the first time its large-scale use as a valuable processing chemical.

The need for developing methods of oxygen production specifically suited for the needs of war became apparent during the defense period. On the day of Pearl Harbor an *ad hoc* reviewing committee of the Office of Scientific Research and Development, appointed by Dr. Vannevar Bush, '16, was formulating its final recommendations for a greatly expanded program of developing specialized methods of oxygen generation. The uses envisioned for this oxygen included: (1) submarine propulsion; (2) breathing of airplane crews at high altitude; (3) airplane "bursts of power"; (4) emergency welding and cutting on shipboard; (5) submarine air conditioning; (6) various medical uses in the field; (7) repair and maintenance of equipment in the field; and (8) secondary fuel for rocket propulsion.

Diverse though these needs were, they had in common the requirement that the oxygen-generating equipment be lighter in weight and simpler in operation than the plants then used industrially. In the course of the development program, these requirements were met. The wartime advances have consisted in modifications of the classical method of producing oxygen, which involves liquefying air and then separating its oxygen by distillation. The specific new developments <sup>1, 2, 3, 4, 5</sup> have already been adequately described from a technical point of view and will be only mentioned here. In brief, they include the low-pressure cycle, based on use of reversing heat exchangers, and improvements in the efficiency of expansion engines.

The reversing heat exchanger consists essentially of three concentric tubes. Through the center tube the out-

<sup>1</sup> Lobo, W. E., and Skaperdas, G. T., "Air Purification in the Reversing Exchanger," *Chemical Engineering Progress*, February, 1947.

<sup>2</sup> Rushton, J. Henry, and Stevenson, Earl P., "Developments in Oxygen Production," *Chemical Engineering Progress*, February, 1947.

<sup>3</sup> Swearingen, Judson S., "Turbo-Expanders," *Chemical Engineering Progress*, February, 1947.

<sup>4</sup> "Oxygen — Past, Present and Prospects," *Chemical Engineering*, January, 1947, pp. 123-131.

<sup>5</sup> Collins, S. C., "Reversing Exchangers Purify Air for Oxygen Manufacture," *Chemical Engineering*, December, 1946, pp. 106-107.

going pure gaseous oxygen flows continuously. Through the two annular channels compressed air and waste nitrogen (at atmospheric pressure) flow alternately. An important feature of the reversing heat exchanger is that, in addition to cooling the incoming air, it purifies the air by freezing out the air's minor condensable fractions, chiefly water and carbon dioxide, along with traces of hydrocarbons derived from lubricants used in the system. These impurities are deposited, as the air cools, on the walls of the channel through which the air flows. After a few minutes of such deposition, the air is switched to another channel and large volumes of nitrogen are sent through the first channel, where the nitrogen evaporates the impurities and carries them out to the atmosphere, thus preventing plugging of the channel with impurities. The conventional method of purification has been by chemical means, in separate equipment.

The effectiveness of the reversing heat exchanger in transferring heat from the incoming compressed air to the cold outgoing oxygen and nitrogen, in combination with other advances, is such that the air can be liquefied after compression to only about 75 to 100 pounds per square inch. The possibility of operating at this low pressure greatly simplifies operation and permits the use of less costly equipment.

To achieve its liquefaction, cold compressed air may be expanded either through a valve or through an engine, by means of which the expanding gas can do work on some mechanism outside the liquefier. Both methods have been used. In the course of the oxygen program, sponsored by the Office of Scientific Research and Development, design features were developed which permitted efficiencies as high as 85 per cent for small reciprocating engines and similar improvements were made in turbo-expanders, adaptable to large liquefiers. The efficiency of the expansion engine largely determines the cost of refrigeration and is particularly significant when dealing with large-tonnage industrial uses of oxygen, where cost is the first consideration.

### Established Industrial Uses of Oxygen

During World War II there was, according to United States census reports, an increase approaching threefold in the industrial use of oxygen; from 4,500,000,000 cubic feet in 1939 to 11,000,000,000 cubic feet in 1946. These figures are for high purity oxygen — 99.5 per cent. In 1946 production was distributed among 228 plants operating in 37 states. According to recently published estimates <sup>4</sup> by The Linde Air Products Company the use of oxygen at the present time is distributed in accordance with the data given in the table on the following page.

Transportation of oxygen from point of production to point of use has always been a serious problem of the industry, and undoubtedly a deterrent to wider application. In the early 1930's shipment was entirely in standard steel cylinders of two sizes holding respectively 110 and 220 cubic feet of gas at 2,000 pounds pressure. Thus, two-way shipment of more than seven pounds of container was necessary for every pound of gas transported in one direction. With increasing use of large quantities by individual users, as in the steel industry, two other methods of transportation came into use in the late 1930's. One method employed 30,000-pound truck trailers carrying multiple high-pressure vessels, holding about 3,000 pounds of gas. The other involved shipment of liquid oxygen at substantially atmospheric pressure. Special insulated tank cars carry 62,000 pounds of liquid, equivalent to 750,000 cubic feet of gas at normal temperatures and pressures. Gas loss through evaporation and venting during shipment is surprisingly small. The liquid is vaporized in autoclaves at the consuming point to deliver gas to high-pressure storage at 2,000 pounds per square inch. In some cases oxygen-producing plants have been built adjacent to those of large consumers, and delivery is by pipe line. It follows that the cost of oxygen to the customer will vary widely. According to recent survey data this variation is between \$3.00 to \$20.00 per 1,000 cubic feet, or \$65.00 to \$450.00 per ton.

In the future, some consumers using oxygen for purposes now well established may side-step the transportation problem by operating their own small oxygen plants, producing between 1,000 and 2,000 cubic feet of oxygen per hour. A low-pressure cycle employing reversing exchangers possesses a number of advantages for small-scale operation. For example, the units can be made largely automatic, requiring no attention from operators except during periods of starting up, shutting



Republic Steel Corporation

*Slab scarifying: a typical industrial operation which may be expected to benefit from new processes of producing low-cost oxygen for industrial uses.*

down, and maintenance. These units can be made quite flexible in meeting the fluctuations in demand for oxygen in metal-working shops. They are also considered less hazardous.

Consumer-operated plants can be expected to compete increasingly with companies long established for the distribution of oxygen, although the long-term results will probably be evolutionary rather than revolutionary in character. With increasing labor costs and advances in the art of using oxygen for multitudinous metal-working operations, it seems more than probable that the market now well served by the extensive distributing facilities of the established industry will not be too adversely affected for a long time. The extent of competition from relatively small captive or consumer-operated plants will depend in large measure upon the ability of the engineer to design plants that are largely automatic in operation and flexible in production, and which involve no maintenance problems beyond the skills ordinarily found in manufacturing plants.

Contrary to statements that have appeared recently in the technical and popular press, the quality of oxygen is not the issue in choosing between purchased and consumer-produced oxygen. It is true that low-pressure plants of the type used in Germany cannot produce oxygen of the highest purity, but this is not true of the type developed in this country during the war. There is, incidentally, a question as to whether many of the uses now served by the high-quality product could not use oxygen of lower quality — down at least to 98.5 per cent.

#### Present Uses for Oxygen

	Subtotal Per cent	Total Per cent
<b>STEEL INDUSTRY</b>		40
MACHINE SCARFING.....	6.5	
HAND SCARFING.....	23.0	
OTHER PRODUCTION.....	8.5	
MAINTENANCE.....	2.0	
<b>STEEL FABRICATION</b>		25
PLATE EDGE PREPARATION.....	7.5	
OTHER CUTTING.....	15.0	
WELDING.....	2.5	
<b>INDUSTRIAL MAINTENANCE.....</b>		8
<b>MISCELLANEOUS USES.....</b>		27
SCRAP IRON PRODUCTION.....	6.0	
CHEMICALS AND PETROLEUM.....	5.0	
AUTOMOTIVE AND AIRCRAFT.....	4.0	
MEDICAL AND BREATHING		
OXYGEN.....	3.0	
OTHER INDUSTRIES.....	9.0	
<b>ALL USES.....</b>		100

This may prove to be a rather important question in the case of consumer-operated plants, as there is a substantial increase in production capacity in low-pressure units with decreasing quality. In the case of one such unit, the capacity was increased by 25 per cent on dropping from 99.6 to 98.7 per cent.<sup>6</sup>

### Prospective Tonnage Uses for Oxygen

With World War II came the necessity of meeting some unique problems and calling upon the participation of individuals and companies who had no previous association with oxygen production. The result has been some new ideas and the education of a number of engineers in this specialized field. General engineering concerns that service the process industries are now in position to design and construct large industrial units. This new familiarity with oxygen production, combined with the wartime technical advances, has brought closer to reality many tonnage uses of oxygen which were only speculations in the prewar era. Although these proposed new uses will draw on the same technical advances as will small consumer-operated plants, the industrial repercussions will be quite different, for, with only isolated exceptions, oxygen has never before been used on the scale and for the purposes now considered.

In recent months oxygen has been much in the news. A good deal has been written, some quite speculatively, about certain new large-tonnage uses for oxygen which are now just beginning to emerge from the experimental or development stage. These include: (1) the use of oxygen to produce carbon monoxide-hydrogen mixtures from either natural gas or coal for use in the synthesis of hydrocarbons and oxygenated chemicals; (2) the use of oxygen in the open hearth to speed up the melting of scrap and reduce the over-all time of the melt, with increased production; (3) the use of oxygen for enriching air used in the iron blast furnace; and (4) the uses of oxygen in gas-generating systems.

### Manufacture of Synthetic Gasoline

The manufacture of synthetic gasoline is rapidly nearing commercial application in this country. The method derived from the German Fischer-Tropsch process and variously designated as the Synthol process, the Synthine process, and the Hydrocol process, has been described extensively in recent periodicals.<sup>7</sup> Synthetic gasoline produced by this process did not play a large part in the German oil technology during World War II. As engineered by the Germans, the unit costs were high and the products inferior to the gasolines available from hydrogenation of coal, on which Germany largely relied for its high-octane gasoline. Research and development work on this type of process in this country since 1938 has resulted in tremendous improvements in technology, greatly increasing the efficiency, reducing investment costs over German commercial applications, improving the quality of the hydrocarbon products, and producing substantial volumes of a large variety of oxygenated chemicals. An engineering feature introduced in this country is the application of the so-called fluidized

<sup>6</sup> Lobo, W. E., "Oxygen by Fractionation at Low Pressures," *Chemical Industries*, July, 1946.

<sup>7</sup> Roberts, George Jr., and Phinney, J. A., "Manufacture of Synthetic Gasoline Nearing Commercial Application in U. S.," *Oil and Gas Journal*, March 15, 1947.

technique, wherein a bed of finely divided solid catalyst is maintained in a turbulent state. The two plants now projected in this country, which are at the engineering stage, will employ oxygen rather than steam for converting methane, under conditions of partial combustion, to a gas having the desired percentage composition of carbon monoxide and hydrogen according to the equation:  $8\text{CH}_4 + 4\text{O}_2 \rightarrow 8\text{CO} + 16\text{H}_2$ .

### Steel Making: Use in Open Hearth

By the use of oxygen in the flame during the charging and the melting-down period of the heat, or by introducing oxygen into the molten metal after melting in order to reduce the carbon content, certain economies have been realized. Large-scale tests have been carried out by several of the large steel companies during recent months with reported savings in time per melt of as much as four hours when handling a charge approximating 400,000 pounds. The amount of oxygen used per ton of steel so produced varies widely according to the conditions of use and may be as much as 600 cubic feet per ton. For a steel plant operating 10 open hearths and having a daily producing capacity of 6,000 tons this would represent an over-all daily demand for oxygen of 3,600,000 cubic feet, equivalent to 160 tons of oxygen. Some estimate that the open-hearth furnace capacity may be increased 40 to 60 per cent by this means. In terms of the cost of oxygen the break-even point will vary widely from plant to plant and change rapidly with market fluctuation and other conditions, but some have concluded that a worth-while saving would be realized if oxygen could be produced at about \$10.00 per ton; others estimate that, to be attractive in terms of the large investment required, the oxygen should be produced for not more than \$5.00 per ton. In all of these large-scale projected tonnage uses for oxygen the price at which it can be produced is the determining factor. Industry-wide adoption of the use of oxygen in open-hearth practice would mean an investment in the near future of up to \$200,000,000.

### Use in Blast Furnace

The iron blast furnace can be rated as one of the most important units in our industrial economy. With more than 200 units and producing capacity of 66,000,000 tons per annum, the United States today has in excess of 50 per cent of the pig iron producing capacity of the world. With the present position of the scrap market, pig iron is in demand beyond the maximum which can be produced today, and new blast furnaces are being planned. From the chemical point of view the factor limiting production is the amount of oxygen that can be blown and converted into carbon monoxide at the tuyères. The amount of air that can be blown into a furnace per minute has been limited largely by mechanical considerations, such as the increasing entrainment of fine ore particles in the blast-furnace gas with higher rates of blowing. With the industry increasingly dependent upon finer grain ores and forced to use inferior grades of metallurgical coke, the trend is toward a reduction in the producing capacity per furnace. Several suggestions are being advanced for correcting this situation. One of these is beneficiation of ore through flotation to increase the percentage of iron content, and sintering to increase the average grain size. A second proposal is to increase the

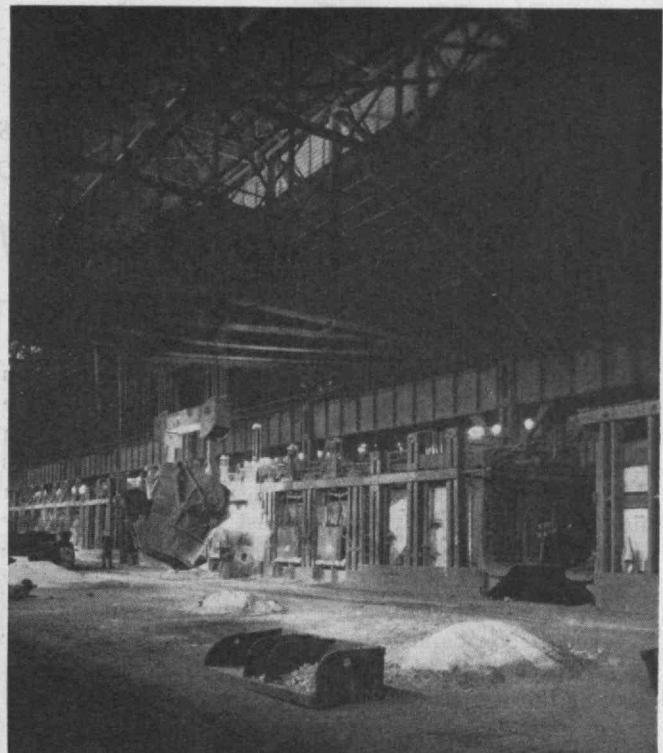
average gas pressure within the shaft of the furnace by increasing the blowing pressure and throttling the discharge gases with increase of top pressures to possibly 20 pounds. Two furnaces have been operating on this principle for some months and have demonstrated the feasibility of substantially increasing the rate of blowing under these conditions, with corresponding increase in production. The third means suggested for increasing production is that of enriching the blast in oxygen. At present the benefits must be calculated from the rather inadequate data of a few tests on European furnaces in 1940 and 1941. Large-scale tests now planned for at least one furnace in this country should decide this controversial issue. With enrichment to 30 per cent. It is predicted that fuel requirements will be cut 8 per cent and production increased about 20 per cent. To break even, oxygen should cost slightly less than \$5.00 a ton, according to estimates of some operators. For enrichment to 30 per cent, a furnace normally blowing 75,000 cubic feet of air per minute would require 12,000,000 cubic feet of oxygen per day.

When this possibility is considered in combination with the rather certain large-scale use of oxygen in open-hearth practice and present substantial demands for oxygen in a steel plant, it is predicted that large oxygen generating plants will shortly be as indispensable and essential for the most efficient over-all operation of a steel plant as are the present utility facilities, coke ovens, fuel gas generators, and power plants. Through such installations will come greater flexibility in adjusting the various operations which enter into the manufacture of steel to meet changing economic conditions within the industry.

### Gasification of Coal

The equivalent of some 170,000,000 tons of coal annually is consumed in the form of gas by industrial and domestic users in the United States. Of this total, gas made from coal accounts for the equivalent of some 21,000,000 tons, and the rest is mostly natural gas transported over long distances in pipe lines.

In this country, gas is made from coal chiefly by three processes, which give rise to coke-oven gas, carbureted water gas, and producer gas. Coke-oven gas results from the heating of coal in coke ovens in the manufacture of coke and is thus essentially a by-product. Cheap oxygen promises to play an important role in the latter two processes. In the traditional water-gas process steam is made to react with incandescent carbon in an operation in which a mass of coke or coal is alternately blown with air, to heat it by the combustion of a portion of coke or coal, and then with steam, to effect gasification of another portion. Blue water gas results and is a mixture of hydrogen and carbon monoxide, with a heating value of nearly 300 British thermal units per cubic foot. This gas is enriched to "city gas" heating-value standards (usually more than 500 British thermal units per cubic foot) by having petroleum oils cracked into it in the carburetor portion of the water-gas set. Producer gas, largely for use in industry, is made by continuously blasting a deep hotbed of coal or coke with a mixture of air and steam. Obviously, the nitrogen introduced as air dilutes the product gas, which may have a heating value as high as 180 British thermal units per cubic foot when made from high volatile coal, and as low as 110 British thermal units per



Republic Steel Corporation

*Charging hot metal in open-hearth furnace. The steel industry will undoubtedly be one of the largest users of oxygen for industrial purposes.*

cubic foot when made from low volatile coke in poor operations.

The complete gasification of coal with resultant high heating-value gas in a continuous process has long been held up as a potential goal in the manufacture of gas from coal. Operation of a process based on the producer-type reactions with steam and oxygen, instead of steam and air, could result in the continuous complete gasification of the coal without the diluent nitrogen being present in the gas. Gasification may be combined with a second step wherein a portion of the hydrogen-carbon monoxide is reacted to form methane, having three times the volumetric heating value. After removal of any carbon dioxide the product of this combination process yields a gas having a heating value up to about that of methane, or about 1,000 British thermal units per cubic foot.

Such a combination of steps may become the means by which coal can be gasified at the mines and the gas transported via pipe line to consuming points, much as natural gas is now transported. This has been visualized with reference to coal mines in West Virginia, Pennsylvania, and Illinois, with distribution of gas to the major industrial regions of northern and eastern United States.

Based on Braunkohle, lower in quality than any coal of commercial significance mined in the United States, and oxygen produced in Linde-Fränlk liquid air plants, the German Lurgi development effects this combination of steps to get a gas of some 500 British thermal units per cubic foot in a continuous process at an efficiency equal to or surpassing that of the producer-gas process.

American chemical engineering talent is now being applied to process design problems, in the solution of which the Germans showed poor aptitude, in order to bring this method of coal (Continued on page 62)

# Colloids in Science and Industry

*From Rubber Tires to Whipping Cream,  
Surface Phenomenon Plays a Predominant Role  
in Creating the Products of Modern Colloidal Chemistry*

BY ERNST A. HAUSER

DURING the last few years colloid chemistry has made many outstanding contributions to science and industry. As a firm basis for future recognition its wartime contributions may be offered, inasmuch as this branch of science was, in fact, an important cog in making possible many of the most important military operations of World War II. Of course, it would not be proper to say that the war was won simply and alone by colloid chemistry. But when our armies landed on the beaches of Normandy, or crossed the Rhine; when our bomber squadrons blasted important military objectives, such as the Krupp armament factories, or the plants of the large German chemical companies in Leverkusen or Ludwigshafen; when Hiroshima and Nagasaki were devastated by the atomic bomb — the colloid chemists are included in the not too large audience who realize that all such operations would have been impossible without knowledge of the colloid chemistry of rubber.

Rubber was needed for the inflatable boats which were used to put our men ashore and the pontoons with which they built emergency bridges. Heavy cannons and tanks would have been useless without rubber caterpillar treads, and, without tires, no bomber could have left the ground. In the final analysis, our entire synthetic rubber industry is based on knowledge of the colloid chemistry of the milk, or latex, which exudes from the natural rubber tree growing in the Far East and in the jungles along the Amazon River and its tributaries.

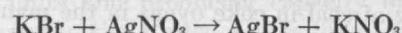
But it is not only in the important field of rubber that colloidal chemistry plays a major role. The entire petroleum industry leans heavily on colloidal chemistry for the many products and by-products derived from petroleum. Indirectly, the American housewife comes into daily contact with the products and results of colloidal chemistry when she uses synthetic plastics, soaps, gelatins, jellies, and even whipping cream.

In spite of its vast and widespread importance, colloid

chemistry is a field which, to date, has not achieved the recognition it deserves. The neglect of this science could be illustrated by citing the devastating floods which have occurred in the Middle West this year, and the fact that Congress is debating the need of allotting a large sum of money to be used in the construction of dams to avoid a recurrence of such a disaster. Yet soil stabilization is no longer a problem for colloid chemists who would be able to make valuable contributions to soil conservation if their advice were sought. Possibly, the neglect of this branch of science lies not alone with industry or government, but, in part, with our educational institutions, for the teaching of colloid chemistry is limited to a few colleges, of which M.I.T. is one. Still, industry, educational institutions, and government research alike have a share in the present status of colloid chemistry, for as has already been pointed out,\* it is no longer possible to neglect this branch of science without inhibiting general progress in science and technology.

### *All on the Surface*

Colloid chemistry should not be considered solely as another branch of chemistry, such as inorganic or organic. As physicochemistry applies to both, so does the science of colloids. Colloid chemistry is actually the chemistry of matter present in such a degree of subdivision that its surface is the predominant factor. It is this surface development, and the lack of chemical saturation of the atoms or ions located therein, as compared to those located below the surface, which account for the reactivity of colloidal systems. To explain in somewhat more detail what is meant, let us consider the following reaction:



Reduced to words this symbolic notation states merely that potassium bromide plus silver nitrate yields silver

\* The Technology Review, February, 1941, p. 158.

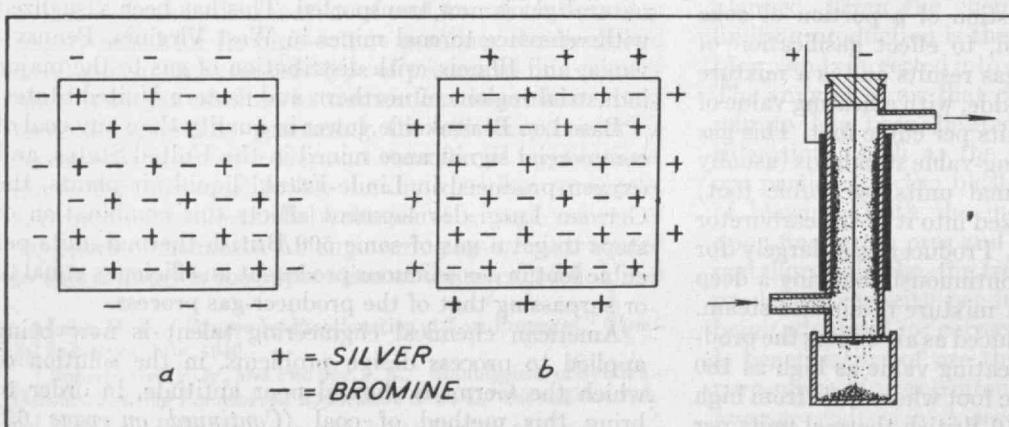


Fig. 1. (left) When potassium bromide and silver nitrate react, newly formed silver bromide particles have negative surface charge if there is excess of potassium bromide as shown at (a); positive charge with excess silver nitrate, as in (b).

Fig. 2. (right) Schematic diagram of Lodge-Cottrell precipitator which makes use of removal of smoke by electrically separating charged colloidal particles.

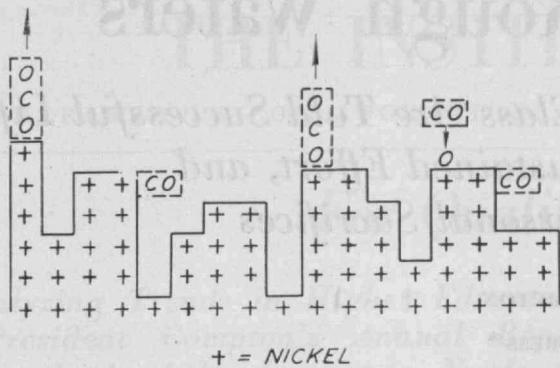


Fig. 3. Surface charge is the basis for the formation of carbon dioxide when oxygen, carbon monoxide, and colloidal nickel are brought together at elevated temperatures.

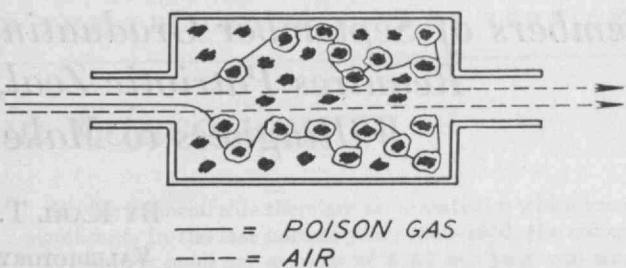


Fig. 4. The effectiveness of gas masks depends upon the removal of poisonous gas particles by combining them with colloidal carbon through the surface charges of these two substances.

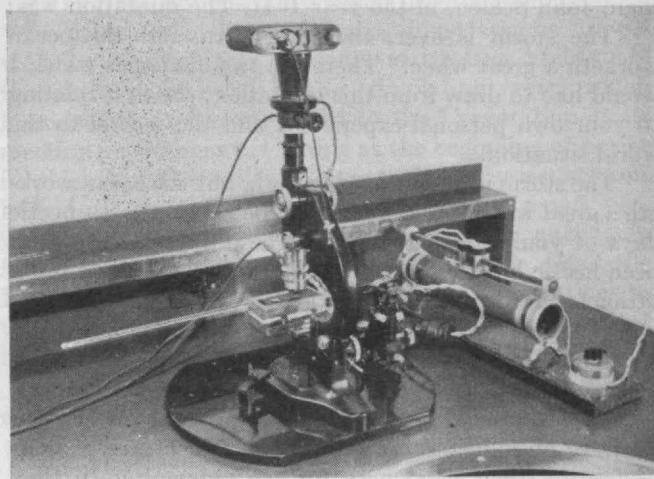


Fig. 5. Direct visual or photographic study of the effects of time and temperature on elastic substances can be studied with new techniques in which incident light is applied to the ultramicroscope whose substage can be heated.

bromide plus potassium nitrate. This reaction — the double exchange of metals and radicals as expressed symbolically above — is all that is of importance to chemists who customarily deal with atom aggregates large enough so that surface phenomena are submerged by the effects of mass action.

The colloid chemist is not yet satisfied with the state of affairs so simply stated by the chemical equation. He notes that the silver bromide crystals which are found in this reaction have surfaces composed of silver and bromine ions which are not saturated; that is, they are lacking ions of opposite charge as compared to those located below the surface. If the reaction is carried out with an excess of potassium bromide, then the silver ions on the surface of the newly formed silver bromide particles will react with some of the excess bromine ions and a particle carrying a net negative surface charge results. The excess potassium did not react with the bromine of the crystals because nature always tends to have a reaction form the least soluble compound. If, however, silver nitrate had been in excess, the particles would have acquired a positive charge due to the preferential (Continued on page 66)

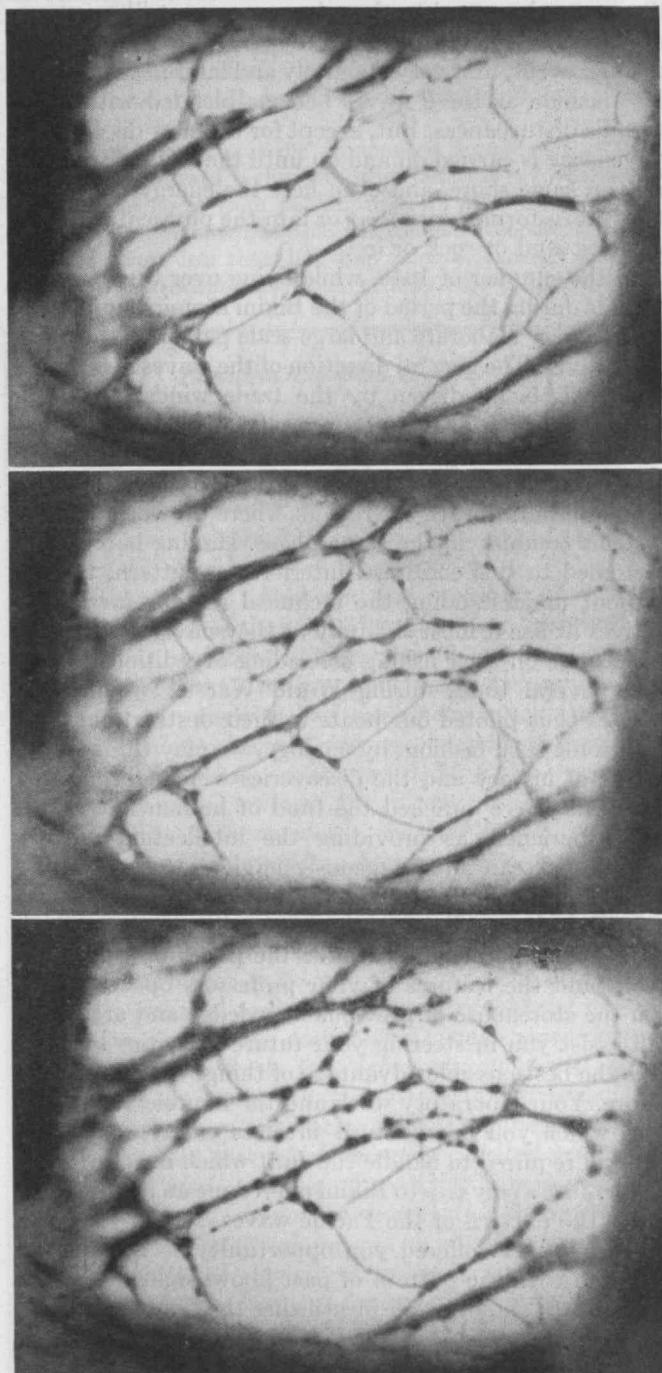


Fig. 6. A series of photomicrographs of a sample of *Cryptostegia grandiflora* rubber showing structure upon formation (top) and the changes which occur after 15 hours (center) and again after 30 hours (bottom).

# Safely through Rough Waters

*Members of September Graduating Class Are Told Successful Life Requires Patriotic Zeal, Sustained Effort, and Willingness to Make Personal Sacrifices*

BY KARL T. COMPTON

VALEDICTORY ADDRESS \*

OFTEN I have thought of the many analogies which can be based upon the waves on the ocean. These waves carry for a long time and to distant places the energy imparted to them by some event like a storm or a suboceanic earthquake. They carry the record of the original event, first very definitely and later in a more diffuse fashion as these waves become blended with other oceanic disturbances. But, except for the slow dissipation, the energy is carried on and on until the wave ultimately dies on some shore, and even here the energy is not lost but is transformed into heat or into the physical displacement of sand or rock or ice.

In the summer of 1946, while flying over the Marshall Islands during the period of the Bikini atomic bomb tests, I saw a very elaborate and large-scale pattern of interference waves. The general direction of the waves is from the northeast, being driven by the trade winds, but from every coral island the waves are reflected so that the entire surface of the ocean is crisscrossed by an elaborate pattern of interference waves with hyperbolic lines of calm alternating with the regions where the various wave systems combine in the same phase. Having become accustomed to this continual interference pattern, though without understanding the technical reasons for it, the natives utilize it most skillfully as they navigate between the islands on their fishing or trading expeditions. There were several times during World War II when these natives thus piloted our boats to their destinations.

In some such fashion, by analogy, we may think of the events of history and the discoveries which, throughout the years, have enriched the fund of human knowledge and experience, as providing the intellectual pattern whereby we can advantageously navigate our own lives if we have the intelligence and training to profit by them.

Just as the waves on the sea reconstitute the pattern of past oceanic events, so have the pages of your textbooks and the lectures of your professors opened up to you the storehouse of previous knowledge and art which will assist you in steering your future activities so as to take the best possible advantage of things that have gone before. Your laboratory work and the innumerable problems which you have solved in class exercises provide the skill required to handle the craft which is your future career. Just as my trip to Bikini offered me an opportunity to see the pattern of the Pacific waves, so has your trip through M.I.T. offered you opportunity to become acquainted with the pattern of past knowledge and experience and to acquire skill in utilizing this information.

\* Delivered to the 439 members of the Class of 9-47, in Walker Memorial, September 26, 1947.

A few days ago in conversation with Governor Bradford of Massachusetts, he called my attention to a very interesting quotation from the writings of an Englishman, John Selden, in the year 1641. The quotation was:

"The storm is over, the wind lieth, but the ocean worketh a great while." There are two analogies which I would like to draw from this quotation: the first relating to your own personal experience; and the second to the world situation.

"The storm is over, the wind lieth, but the ocean worketh a great while." The storm may be likened to the hectic days of your career at M.I.T. These days have not all been hectic but this institution has a well-deserved reputation for hard work and there are periods of examinations and tests or other emergencies which are unusually strenuous. The unsettled conditions of our postwar readjustments have accentuated these various disturbances.

Now, "the wind lieth". The examinations are passed. You are no longer subject to the daily lectures of your professors (their wind lieth for the moment until they have to begin lecturing to the new classes). The winds and storms of life will again blow around you from time to time as you settle into your professional activities.

"But the ocean worketh a great while." By this I mean that the influences which have been created in and around you during the college course will, like the waves, continue to operate for a great while and in fact throughout your lives. As time goes on the particular influences of your educational experience will become blended with many other influences from the activities and environment in which you work, and the whole of these influences will constitute the ever growing pattern by which, with intelligent interpretation and skillful adaptation, you can steer your life's career.

Finally, at life's end, your individual pattern will break up in the sands of time but even then, as also throughout your life, the energy or influence of your lives is not lost but is rather transformed or continued in some other form.

Turning now to the second analogy which applies to world events, I can make the application suggested by Governor Bradford — "The storm is over, the wind lieth, but the ocean worketh a great while." The storm of World War II is past, the fighting has stopped, the tremendous pressure of war activities has dropped, but still "the ocean worketh a great while" because the economic and political disturbances created by the war are still with us and will be with us for many years to come. Just as during the war the great problem facing our civilization was to ride through the storm successfully, so also, now that the storm is over, the world is still faced (*Concluded on page 70*)

# THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

## For Quality in Education

### *Analyzing Trends in Higher Education, President Compton's Annual Report Emphasizes the Institute's Needs for Postwar Leadership.*

TRENDS of higher education in the United States and the responsibility which privately endowed institutions of higher learning must assume for developing leadership in students of superior ability are thoughtfully analyzed in the stimulating report which President Compton presented to the Corporation at its meeting on October 6. Coming at the beginning of a year in which M.I.T. is called upon to train the largest student body in its history, Dr. Compton's annual report provides an admirable survey of the need for quality in higher education, and records in considerable detail the Institute's current program for fulfilling its obligations to the nation as well as to its present portal-bulging student body.

In his discussion of the status and trends of higher education in the United States, Dr. Compton reported:

Most of us have been prone to think of the present over-crowded conditions in our institutions as due to the sudden release to college of the great group of young men whose education had been interrupted by military service, this trend to college being aided and abetted by the G. I. Bill of Rights. This is of course true. What is not generally realized, however, is that the present total college enrollment is really not very far out of line with what it would probably have been if the trends of enrollment during the years prior to 1940 had simply continued uninterruptedly through the war years to 1946. For several decades there has been a steady increase in the number of our young people going on for higher education. If it had not been interrupted by the war and if the prewar curve had been extrapolated through the war years, the total enrollment in institutions of higher learning would be just about what it is today. The difference is that this enrollment has come upon us suddenly after the discontinuity of the war, and our institutions have not been able to adjust themselves to it financially and in facilities and teaching staff so readily as if the growth had proceeded in its gradual, normal manner.

In the past academic year there were a little more than 2,250,000 students enrolled in our institutions of higher learning. This is nearly 60 per cent more than in 1939-1940 and is four times as many as were enrolled immediately after World War I in 1920. The Office of Education estimates that there will be at least 3,000,000 students in our institutions of higher learning by 1950 and that this number will continue at somewhat like this level until there is another big jump in the 1960's with the increased number of young people who were the war babies of World War II.

On the average, about one in every three high-school graduates now goes on to college. Spot surveys in several parts of the country indicate that less than half of the best of the high-school graduates go on to college and that the principal reason for this low proportion is lack of financial resources.

On the financial side there are some statistics which are quite significant. In the last normal year, 1939-1940, the colleges of the country spent an average of \$350 per year per student. This is of course the cost of education and does not include the living costs of the students. The significant fact, however, is that the average annual amount spent by our colleges per student, reduced to terms of the purchasing power of the dollar, has steadily declined ever since 1930. This fact, combined with the progressively increasing demand for higher education, can mean only that our country has let the pressure for numbers and the competition of other demands upon our national income operate to an over-all decline in the quality of our higher educational program.

One reason for this is the pronounced decrease in private contributions toward higher education and the corresponding increase in support from public funds. In 1920-1921 private contributions amounted to \$158 per student, whereas in 1941-1942 they were less than half this amount, namely, \$73 per student. The tendency has been to take care of the demand

### *President Compton Reports*

*Dealing with problems of higher education in the United States, in his report to the Corporation on October 6, President Compton stated that:*

*People in the United States spend 20 times as much for amusements, cosmetics, jewelry, tobacco, and liquor as they do for education at university level.*

*Present college enrollment is probably what it would have been if the prewar trend had been permitted to continue uninterruptedly between 1940 and 1946.*

*The almost complete cessation of normal educational activities at university level during the war, followed by the sudden, abnormal increase in postwar enrollment are the primary factors responsible for the present difficulties which colleges face in their finances, in maintaining high standards, in building adequate faculties, and in expanding housing and educational facilities.*

*It is both proper and inevitable that the Federal Government should sponsor higher education to a greater extent than it did prior to World War II.*

*Since political tendency is toward equality of distribution, the obvious danger of Federal sponsorship is that the standards for higher education will be lowered to the level which the masses can assimilate.*

*The complementary factor which is required, therefore — and the task which privately endowed institutions must meet — is that of providing superior education for, and developing leadership of, superior students willing to work for and merit opportunities.*

*The continued strength of privately controlled institutions must be looked to for sustaining high standards in publicly supported institutions of learning.*

### *The Year's Highlights at M.I.T.*

*The following highlights are extracted from the President's Report, given by Dr. Compton to members of the Corporation at their annual meeting on October 6.*

*New educational facilities added during the year include a field station for the Laboratory of Nuclear Science and Engineering, and a new Gas Turbine Laboratory which was dedicated on October 7.*

*The 5,600 students enrolled for the year 1947-1948 represent an increase of 80 per cent over the Institute's prewar stabilized enrollment, and a 10.8 per cent increase over the previous all-time high of last year.*

*The gift of \$500,000 from the Alumni Association supplements funds earmarked for student housing and makes possible the construction of a new Senior House accommodating 360 students, begun October 6.*

*The Institute's nonstudent personnel exceeded 3,400 in 1947 as against 1,300 in 1940.*

*Total expenditures for the fiscal year 1946-1947 exceeded \$17,000,000 or more than five times the largest prewar budget.*

*Now operating a \$17,000,000 program with plant and endowment adequate for a \$3,500,000 prewar program, the Institute has initiated a program for increasing its financial resources by about \$21,000,000.*

for college education more and more through the tax-supported institutions, and these of necessity have had to cater more to the mass than to the individual. Although only one-third of all the institutions of higher education in the United States are tax supported and under public control, these one-third enroll more than one-half of all the students.

The financial problem confronting the institutions of higher learning is easily understood from the combination of the following factors: (1) the decrease in private contributions, which undoubtedly is due to the higher income-tax rates; (2) the fact that income from invested endowments has decreased by at least a third; (3) the increase in over-all operating costs, including salaries, wages, and costs of material, which have approximately doubled. . . .

On the average over the country student fees took care of approximately 40 per cent of the cost of instruction in 1939-1940, but at the present time this average has risen to 56 per cent. In other words, the colleges, faced with the financial dilemma, have been forced to meet at least part of their financial problem by increases in tuition. In one way I believe that this is generally justified because the average per capita earning power of the American people has approximately doubled in this same period. It is reasonable to expect, therefore, that the average family could take care of twice as much cost of education as it could have in 1939-1940. . . .

### *... Education: Quantity and Quality ...*

There seem to me to be two major objectives which tend to dominate the direction in which our higher education is moving. Both of these objectives are good and they should be complementary. There is a danger, however, that they may become harmfully competitive. . . .

The steadily increasing demand by the public for higher education, combined with the shortage of any other funds for providing this education, has given increasing stimulus to the demand for larger public appropriations. The states are very spotty in their response to this demand. The trend has therefore been toward Federal funds for such support. . . .

A strong argument can be made for such Federal support on at least three grounds: In the first place, it would meet a public

demand. In the second place, it is the only apparent way in which educational opportunities can be more or less equalized for students from various parts of the country. In the third place, the lessons of World War II have emphasized the importance to our national security of a population which is well educated, not only in the scientific and technical lines but also in the facts of history, economics, and social institutions. I believe, therefore, that it is both proper and inevitable that the Federal Government should step into the breach and sponsor higher education to a substantially greater extent than in the past. It remains to be seen whether such support will be made available on some appropriate basis to all qualified institutions of higher learning or only to existing and to new publicly controlled institutions, and also whether it will be accomplished by outright grants or by some form of contracts.

Both inevitable and proper in the thinking of Federal agencies is the attention to the masses of the population. The ideal will be to make higher education available to all who are qualified to benefit by it, irrespective of race, religion, or economic status. . . . The young manhood and womanhood of the country will be viewed as raw materials which should be properly developed as national assets.

Freely granting the logic and the benefits of such a program, there are some dangers inherent in it unless certain complementary moves are also made. The most obvious danger is that the entire program of higher education will be brought to a mass level which at the worst could be mediocre and at the best could be rather far from optimum. The complementary factor which is required is attention to a superior type of education, admittedly more expensive and selective than that which can be afforded for the masses, aimed primarily at providing the highest quality of educational advantage for students of superior potential and at the same time providing the best possible type of educational leadership for all higher education. It is possible, if Federal funds are wisely administered, to give proper emphasis to this quality factor as well as to the quantitative factor. This has been notably achieved already in the case of certain state institutions. Nevertheless, the political factors are against long-term emphasis on quality in state institutions because it is politically difficult to justify under governmental auspices a higher grade of opportunity for one person than for another. The political tendency is always toward equality of distribution.

Here, as I see it, is the great continuing challenge to the privately supported educational institutions. To some of them, at any rate, in every category of liberal arts or professional education, there is the responsibility of providing leadership, and of providing the opportunity for a type of education which is superior to that which can be provided for the masses and which should be made available to those qualified individuals who are able and willing to pay the price as an investment in their future. The existence of such institutions as Harvard, Chicago, M.I.T., and many others is, in the last analysis, the greatest safeguard of higher education against the dangers of political domination. I believe that the continued strength of these great privately controlled institutions will be responsible in no small measure for sustaining the excellent standards and high-minded administration of the majority of the publicly supported institutions.

Lest I be misunderstood, let me amplify the preceding paragraph. I do not argue for an undemocratic special privilege for a favored class. I do argue for freedom of the student to seek special educational opportunities and to profit by them if he is exceptionally qualified. For some students this will be easier than for others, thanks to financial resources which are incentives and rewards of our free enterprise system. But any young man can work, as I and my father before me and thousands of others have done, to earn these opportunities. And the most promising students can be helped by the scholarship and loan funds which so many socially minded people have generously provided for just this purpose.

Critical study of the origins of the basic new discoveries and

concepts which underlie so much of our modern civilization points almost startlingly to their origin in countries where highest educational opportunities have been largely concentrated on the most gifted, or most fortunate, among their youth. What we must try to achieve in America is a high level of mass education which will provide especial opportunity and all possible help for those who combine special gifts for creative scholarship with the earnest ambition to make whatever sacrifices may be necessary to achieve their goal.

To those, therefore, who believe sincerely in free enterprise, in the value of initiative to develop and operate institutions of superior quality, to those who wish to make available such opportunities to the most gifted of our youth, there is a great challenge. Since the most serious problem confronting all institutions is a financial one, the response to this challenge must also be measured in large part in financial terms. . . .

The total cost of all higher education in the United States is annually about half of one per cent of our national income, or a little over \$800,000,000. For purposes of comparison, this amounts to about one and a half days' expenditure by our country in World War II; or about one-third the amount which is spent annually for operating our entire secondary-school system; or about one-half the estimated cost of operating universal military training for one year. Put another way, \$800,000,000 is about five per cent of the amount which the American people spend each year for liquor, tobacco, jewelry, cosmetics, and amusements. The aggregate capital funds held by all institutions of higher learning in the United States are about one and three-quarter billion dollars, or about equal to the total assets of all the great altruistic foundations of the country.

These sums, while large, are small in comparison to the relative importance of the objective. If the importance of this objective is adequately realized by thoughtful people in the community, it should be easily possible, through private gifts from individuals, foundations, and corporations, to maintain our strategically located private institutions of higher learning in a condition to supply the leadership and the opportunity which are necessary to balance in a wholesome manner the increasing trend toward higher mass education. . . .

#### ... M.I.T. Year in Review . . .

Our enrollment during the present term will probably reach 5,600 students, an increase of 80 per cent over our stabilized prewar registration. Our total expenditures for the fiscal year 1946-1947 exceeded \$17,000,000, which is more than five times our largest pre-war budget. Our total nonstudent personnel, which numbered 1,300 in 1940, has exceeded 3,400 in 1947.

#### SENIOR HOUSE

*On October 6, President Compton broke ground along Memorial Drive for a new senior dormitory designed to house 360 students. Designed by the Finnish architect, Alvar Aalto, Senior House will afford a view of the Charles River and Boston from each room, as this model indicates.*

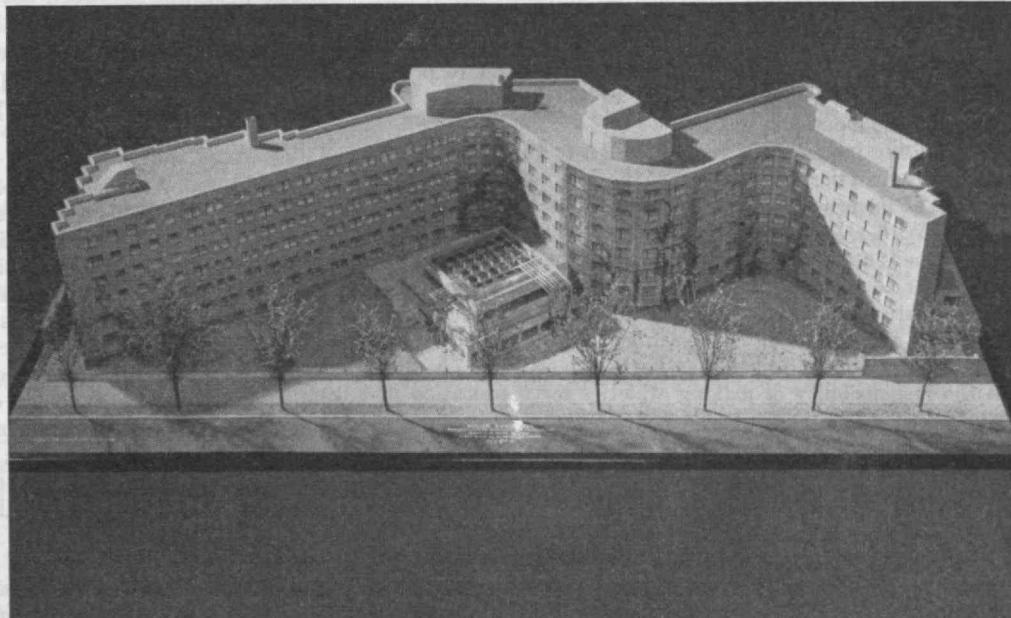
*A gift of \$500,000 from Technology Alumni made possible the construction of this much needed unit at the present time. It is anticipated that the dormitory will be available for occupancy by next summer.*

While we do not wish this present overload long to continue at its present level, I believe it fair to say that it has not yet held our figurative nose to the grindstone so completely as to prevent forward-looking activities along with the heavy routine. The past year, in fact, brought steady progress in the retesting and rethinking of the Institute's program and witnessed a mounting interest throughout the Institute in new ways of enriching our educational work. Creative research has flourished. There is some indication that publication of research results has lagged through lack of time to prepare manuscripts and through the persistence of the wartime habits of reticence.

#### ... Educational Survey . . .

Last year, in my report, I spoke of the desirability of a strong faculty committee to review our educational policies and procedures. Such a committee has been appointed, together with a group of sub-committees, and has initiated a deeply probing study of those factors which make an educational institution vigorous in scholarship and in spirit. Not only is it reviewing our undergraduate curriculum in the light of our prewar objectives but it is reaching out to consider what the objectives of the future should be in the training of scientists, engineers, and architects. It is giving special attention to the problem of how to take the next step in creating a more effective partnership between the humanities and professional education and in specifying what kind of training will best equip an engineer to handle the great social responsibility and power which must inevitably rest in his hands. And, finally, it is tackling some of the imponderables mentioned above, which promote scholarship and which build citizenship. What, for example, are those factors which we must emphasize in the future to provide the best possible environment for scholarly, creative work by students and staff? This committee includes Professor Warren K. Lewis, '05, chairman, Professor John R. Loofbourouw, secretary, and Professors Ronald H. Robnett, C. Richard Soderberg, '20, and Julius A. Stratton, '23.

Concurrently with the study by the Committee on Educational Survey, other approaches to the problem are being followed. The Committee on the Graduate School, under the leadership of Dean J. W. M. Bunker, has reaffirmed and protected our high standards of graduate study while at the same time it has provided greater flexibility and freedom to the individual student in pursuing his professional objectives. New ways of organizing and co-ordinating research with teaching have been tested and policies formulated for handling sponsored research to the advantage of the academic program. Throughout the Institute there is clear agreement that the acceptance and



priority of any sponsored research program are governed by the extent to which the proposed activity will carry forward the educational objectives of the institution. The acceptance of this principle has been accompanied by the general recognition that our sponsored research programs can, if properly managed, help to create the environment most conducive to scholarship and creative activity.

During the year there has been a fresh and constructive concern with teaching methods throughout the Institute, and several departments have instituted programs for checking and improving the instructional techniques of young staff members. Reflecting the current interest of students in educational methods, one of the student honorary societies has undertaken careful evaluation of individual instructors in selected departments, with the wholehearted collaboration of the departments.

There has been a trend, continuing from before the war, toward deepening engineering education through the adoption of more of the analytical tools of pure science, through more graduate training in engineering, and through the use of research to attract men of imaginative minds. Similarly the science departments have been deepening their programs, and the push, which began in earnest in 1930, to build a great School of Science occupying a position of equal partnership with the School of Engineering, is well on the way to its objective.

During the year, two highly useful additions to our educational facilities were brought into use. One of these, which we acquired by purchase, includes an Army-built structure and 46 acres of land in Lexington, Mass., which will serve as a field station for our Laboratory for Nuclear Science and Engineering. The other is our fine new Gas Turbine Laboratory, which . . . gives us the most complete gas turbine laboratory to be found in any educational institution.

#### *. . . Broadening Technological Education . . .*

Concurrently with the study of the Committee on Educational Survey, immediate efforts are being made to strengthen our program. Everett Moore Baker, who was appointed dean of students on January 1, 1947, and Thomas P. Pitre, who became dean of freshmen at that time, are systematically encouraging extracurricular activities and student counseling as effective tools to build citizenship and to widen the outlook of students. They have also developed ways of integrating these extracurricular activities with our humanities studies. For example, we have engaged a new staff member who will not only have charge of our courses in music appreciation but will be consultant to the dean of students on our growing student musical activities. The students have responded with instant and hearty appreciation and collaboration. The registration officers in all the professional courses have stepped up their own effective contacts with students, and throughout the Institute, personnel have thrown themselves into the over-all movement to bring students and staff into a community of scholars having the broadest possible outlook.

Contributing importantly and by design to this community building has been the new Director of the Medical Department, Dr. Dana L. Farnsworth, the Institute's first full-time Medical Director. With a background of both psychiatry and internal medicine, he is an ideal successor to Dr. George W. Morse, who retired after 26 years of service. And to serve the general welfare of the students, in close relation to the Office of the Dean of Students and the Medical Department, a full-time Director of Athletics, Ivan J. Geiger, has been engaged and charged with the responsibility of making athletics serve education in the broadest sense. Toward this end he has already greatly stimulated intramural athletics.

#### *. . . Assistance to Students . . .*

A significant section of President Compton's annual message dealt with assistance available to students at Technology. Prominently mentioned was the vigorous and helpful participation of the Corporation Committee

on Student Activity, headed by Donald F. Carpenter, '22, whose program of new developments affecting student life was recorded on pages 544 and 548 of the July, 1947, issue of *The Review*. The resolutions of the Committee on Student Activity, adopted by the Corporation at its meeting last June, inaugurated a program for extended dormitory, athletic, and recreational facilities for Technology students.

President Compton's report also recalled the \$500,000 gift of the Alumni Association to be used toward the construction of a new Senior House, as already reported on page 537 of the July, 1947, *Technology Review*. Designed to house 360 students, Senior House construction was officially inaugurated on October 6 during ceremonies at which Dr. Everett M. Baker, Dean of Students, presided. Brief addresses were made by President Compton, representing the Administration, Donald F. Carpenter, '22, for the Corporation Committee on Student Activity, by Raymond H. Blanchard, '17, President of the Alumni Association and representing Technology Alumni, and by George K. Parmelee, '49, representing the student body as president of the Institute Committee. Also taking active part in the ground-breaking ceremonies were Professor Leicester F. Hamilton, '14, chairman of the Dormitory Board, Donal L. Botway, '50, chairman of the Student Dormitory Board, and Vice-president James R. Killian, Jr., '26.

#### *. . . New Era . . .*

In setting forth the Institute's future plans in fulfilling its objectives for providing outstanding higher education in science and engineering, President Compton reported:

The year also brought the opening of a sustained effort to increase the Institute's financial resources. The present capital needs of the Institute are estimated to be of the order of \$20,800,000, and we are aggressively occupied at the present time in seeking funds, project by project, to finance these needs. Any effort of this sort must go through an initial phase devoted to informing potential donors fully about the needs of the institution, and we are at present in the middle of this problem of stating our case. The next phase will require more extensive organization involving both Corporation and Alumni.

The program has been set forth in a bulletin entitled "M.I.T. — A New Era" which has been distributed to alumni readers of *The Review*.

Significant progress toward the realization of the Institute's capital needs conclude Dr. Compton's report in the following words:

The George Westinghouse Educational Foundation has established a George Westinghouse Professorship in Mechanical Engineering, which will be publicly announced very shortly.

The very attractive plans for the Charles Hayden Memorial Library were found to require funds substantially beyond those available. The architects have restudied the problem and arrived at a new plan which, in its preliminary showing, seemed to all who saw it to be even better than the earlier design and probably capable of erection within our budget.

Construction is under way on the Navy-financed, M.I.T.-operated supersonic wind tunnel, located on the extreme western end of our property. This project, involving about \$2,600,000, will make available to us a facility in this field unsurpassed by any other in the country.

Based upon a finding of need by the United States Office of Education that the facility is necessary to provide education and training to veterans, the Bureau of Community Facilities



Photo by Miller Studio

Members of the Class of 1897 celebrating their 50th reunion at East Bay Lodge, Osterville, Mass., last June when this photograph was taken. In the first row, left to right, are: Chester D. Hubbard, Edward A. Sumner, Francis H. Shepard, Thomas R. Weymouth; in the second row, Edwin R. Olin, W. Charles Dunn, William D. Parker, John A. Collins, Jr., Henry E. Worcester, Stanley A. Hooker, Gilbert H. Pratt; and, in the last row, standing, Harry F. Sautelle, Charles H. Eames, Frederick L. Edmonds, George R. Wadleigh, Arthur S. De Wolf, Luzerne S. Coules, Proctor L. Dougherty, Irenée du Pont, Royal H. Hayward, Augustus C. Lamb, Henry A. Clark, Dr. Albert P. Norris, Frederick A. Hunnewell, William Binley, John P. Ilsley, Charles R. Currier, Benjamin A. Howes, Wilfred Bancroft, Allen W. Jackson, Charles B. Breed, Henry W. Ballou.

of the Federal Works Agency is making available to the Institute a large drill shed located at Camp Peary, Va., which the Navy has declared surplus. This building will be transported to Cambridge, where 33,000 square feet of it will be used to construct an athletic building 200 by 165 feet; the remaining 17,000 square feet will be available to a government research project which needs hangar facilities at the Bedford Airport. Through the acquisition of this large structure, the Institute will be able by spring to have an athletic cage which essentially fulfills specifications which had been set up for this part of our ultimate athletic development.

A number of gifts or pledges have been received toward the Hydrodynamics Laboratory and Naval Towing Tank, but substantial funds remain to be secured before this laboratory can be constructed.

In support of our program in Nuclear Science and Engineering, which at present is being financed largely through the Office of Naval Research, one initial industrial contribution has been received and another large contribution has been pledged conditioned upon contributions from at least three similar corporations. Based upon negotiations to date, we feel exceedingly optimistic over the possibility of successfully arranging for this private support of our program during a period of several years.

## Heads Mechanical Engineering

APPOINTMENT of Professor C. Richard Soderberg, '20, as head of the Department of Mechanical Engineering at the Institute was announced by Dr. Karl T. Compton as the July issue of *The Review* was being printed. Professor Soderberg's new appointment will permit Dr. Jerome C. Hunsaker, '12, who has been head of both of the Departments of Mechanical and Aeronautical

Engineering since 1933, to devote his entire attention to direction of the Institute's rapidly expanding program of research and instruction in aeronautical engineering, a field in which he has long been widely recognized as an authority.

The Department of Aeronautical Engineering grew out of the first professional course in that field which Dr. Hunsaker established at M.I.T. in 1914. Just before the beginning of World War II, the Wright Brothers Wind Tunnel was completed and with the beginning of hostilities it became one of the most important centers of research on aircraft design and performance.

The new supersonic wind tunnel now under construction for special research for the United States Navy will be operated by the Department of Aeronautical Engineering, which also has a full program of research on many other problems associated with flight.

Professor Soderberg, whose appointment as head of the Department of Mechanical Engineering became effective on July 1, has been deputy head of this Department for some time.

During the war Professor Soderberg served on the special committee on jet propulsion of the National Advisory Committee for Aeronautics. He also served on other government committees for studies of tank design and evaluation of gas turbine power plants for ships, and was consultant on the development and design of power plants in torpedoes. Since the war he has been a member of the subcommittee on turbines of the National Advisory Committee for Aeronautics and chairman of the panel for aircraft, fuels, and propulsion of the Scientific Advisory Board of the Army Air Forces.



*The Class of 1902 observed its 45th reunion when members gathered at Osterville in June. Seated, left to right, are: Alfred W. Friend, Grant S. Taylor, Burton G. Philbrick, Chauncey P. Manning, Frederick H. Hunter; standing, in the second row, Wilbur L. Vatter, Cecil B. Annett, Lewis E. Moore, Edwin E. Nelson, J. Albert Robinson, Walter P. R. Pember Francis B. Galaher, Arthur L. Collier; and, in the last row, Lester C. Hammond, Albert A. Haskell, Charles W. Kellogg, Robert S. Baldwin, Stephen A. Gardner, John C. Fruit, William M. Bassett*

### *Encore! Class of 1947*

**F**INAL group in this Class (in addition to the February and June, 1947, graduates) were the 439 members of the Class of 9-47 who were awarded a total of 442 degrees at the commencement exercises which were held in Morss Hall, Walker Memorial, on September 26.

As one of the last "off season" graduating classes, resulting from the accelerated program of instruction which operated during the war, 30 doctor's, 158 master's, and 251 bachelor's degrees were conferred. In addition, three graduates received both bachelor of science and master of science degrees.

Everett M. Baker, Dean of Students, opened the commencement exercises with the invocation. Assisted by John W. M. Bunker, Dean of the Graduate School, President Compton presented degrees to the graduates. Dr. Compton also gave the commencement address which The Review is pleased to present on page 38.

Following the presentation of degrees, a reception was held in Morss Hall by President Compton for this new group of M.I.T. Alumni and those who were present at the exercises.

### *For Tomorrow's Physicists*

**T**HE Visiting Committee on the Department of Physics\* held an all-day meeting on January 24, 1947, in which the morning session was devoted to a consideration of the undergraduate teaching, with particular reference to instruction given to students in other courses.

\* Members of this Committee for 1946-1947 are: Francis J. Chesterman, '05, chairman, Roy D. Mailey, '04, A. Warren Norton, '21, James B. Fisk, '31, Percy W. Bridgman, Alfred L. Loomis, and Henry D. Smyth.

An inspection was made of the new Physics Laboratory and the teaching rooms made available by the moving of the Department of Geology. The Research Laboratory of Electronics and the Laboratory for Nuclear Science and Engineering were also visited by the Committee. After lunch, at which some of the problems were discussed, the Committee adjourned for a further review of the problems of the Department and its objectives.

Nearly 2,000 freshmen and sophomores and an increasing number of juniors and seniors from other departments had been receiving instruction in undergraduate physics. The new quarters, providing laboratory space for the Department on the third floor of Building Four, will make it possible to correlate the undergraduate activities more satisfactorily and to administer them better than in the past. A review of the subjects taught to the undergraduates indicated that no immediate changes were required, particularly since a committee, under the chairmanship of Professor Hans Mueller, has been active in planning and carrying out changes in undergraduate work, and has recently evolved a more satisfactory arrangement of subject matter.

The Committee was greatly impressed with the organization of the two main research laboratories, which largely account for the graduate work: the Research Laboratory of Electronics, operated jointly by the Departments of Physics and Electrical Engineering, under the direction of Professor Julius A. Stratton, '23; and the Laboratory for Nuclear Science and Engineering (comprising the Radioactivity Center, the High Voltage Laboratory, the Cosmic Ray Laboratory, and the theoretical group) directed by Professor Jerrold R. Zacharias.

The fundamental conception of these two laboratories, involving close co-ordination with the work in other

(Continued on page 46)

# BUSINESS IN MOTION

## To our Colleagues in American Business ...

There is a well-known combination lock for safes and vaults that employs five different Revere Metals, as follows: 1, 70-30 Cartridge Brass for the dial flange; 2, Commercial Bronze, 90%, for case, case lid, and bolt; 3, Heavy Leaded Brass for tumbler parts and other items, including dial, requiring exceptional accuracy; 4, Free Cutting Brass in Rod and Extruded Shape, for the machined and knurled head, and for the angle bar; 5, Forging Rod, for the tumbler driver. Each of these was chosen because it offered the specific qualities needed.

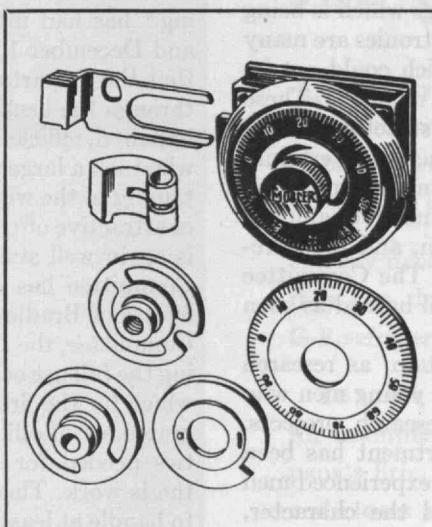
Before specifying the Revere Metals for this lock the manufacturer studied their qualities and characteristics with great care, making use of our knowledge as well as his own. Thus he was able to make accurate and successful selections, draw up tight specifications, and be sure of meeting not only the requirements of fabrication methods, but also assure strength, long life, and dependable operation of the finished locks.

Revere produces many Revere Metals in order to give manufacturers the opportunity to match materials and requirements with the utmost accuracy. Each metal is made in several different forms or shapes. Variations in temper and finish are also offered, because these characteristics can be as important as com-

position. A slight change in temper, for example, may change a difficult and expensive drawing operation into an easy and economical one.

Revere feels that it has four fundamental responsibilities to industry. First, it must, and does, produce the finest possible non-ferrous metals, accurately controlled as to purity, physical characteristics, dimensions. Second, it produces these metals in such variety as to enable manufacturers to choose exactly what they need for their products and processes. Third, it produces them as promptly as possible, in order to assist in meeting production dates. Fourth, it makes available its complete knowledge of its metals.

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## THE INSTITUTE GAZETTE

(Continued from page 44)

courses, is eminently sound. The research in the Laboratory for Nuclear Science and Engineering, for example, brings together staff in the Departments of Chemistry, Electrical Engineering, Chemical Engineering, Metallurgy, and Mechanical Engineering. Moreover, the personnel in charge of each laboratory is drawn from the departments interested in the activities of that particular laboratory. This policy emphasizes collaboration and co-operation, rather than competition, and brings to each laboratory the talent which is available in the departments affected. The size of each laboratory has been fixed by the essential requirement that the permanent staff consist of professors of the Institute. The Committee was impressed by the number of investigations going on, as well as by the scope and magnitude thereof. Moreover, it is apparent that thoroughly competent people, outstanding in their knowledge and capabilities and forward-looking in their several branches of research, are engaged in this work at the Institute.

It is obvious that space, which will be provided in a new building, is needed for the Nuclear Science and Engineering Laboratory. It is hoped that this new construction will be undertaken shortly. On the other hand, in one of the temporary wartime buildings which is being used by the Research Laboratory of Electronics are many valuable tools and instrumentalities which could not be replaced even if the money to do so were available. These are housed in a temporary nonfireproof structure, which constitutes a potentially serious fire hazard. Certainly if the apparatus, mechanism, and tools in the temporary building were lost as a result of fire, a tremendous amount of time would be taken to replace them, and much research of importance would be delayed. The Committee recommends elimination of this potential hazard as soon as possible.

The Department has been able to retain, as research associates and research assistants, many young men who had served on wartime government research projects. Through these appointments the Department has been able to obtain a staff of well-trained and experienced men in the various experimental fields, and the character, quality, and amount of the work they are carrying on are ample evidence of the wisdom of this move.

In addition to the research associates and research assistants, there is a group of teaching fellows, on whom the Department is relying for much of the teaching in the undergraduate courses. The salaries of teaching fellows compare unfavorably with the salary scale of half-time and full-time research assistants. It is the conviction of the Committee that the Institute should provide better compensation for the teaching fellows. It is important that the morale of these men be high; the salary paid should be enough to enable them to live modestly. The problem is one which, in the opinion of the Committee, merits immediate solution, although the Committee realizes, of course, that this action must be co-ordinated with similar situations which may exist in other departments as well.

It is not possible, of course, to carry on the work of the two major laboratories except with outside assistance.

The contract between the Institute and the Signal Corps, the Air Forces, and the Office of Naval Research supports the Research Laboratory of Electronics to the extent of \$600,000 a year, and the Laboratory for Nuclear Science and Engineering is being supported by the Navy with a considerably larger sum. This is at once a strength and a weakness. It should be recognized, as the Committee is sure it has been by the Administration, that there is a considerable risk involved in undertakings of these magnitudes which rely so completely on external support for their operation. The second point which must be constantly kept in mind is that with such large research undertakings, the primary objective of the Institute, namely, teaching, might be lost sight of. The Committee is fully cognizant of the wise decisions which have been made with respect to these points.

Finally, the feeling of the Committee is that the whole situation is well in hand, that the quality of the work being done by the upper classes in experimental physics is well advanced, and that the attitude of the entire Department is one of forward-looking, eager enthusiasm for the work of the Department, with a well-balanced attitude of co-operation with other groups of the Institute.

### Questions on Chemical Engineering

**S**INCE it last reported to the Corporation, the Visiting Committee on the Department of Chemical Engineering\* has had interim meetings on November 10, 1944, and December 1, 1946. The Committee is glad to report that the Department of Chemical Engineering has come through the hectic war years with improved, rather than impaired, efficiency. Practically all the staff members, who took a large part in manifold technical activities pertaining to the war, have returned to the Institute in spite of attractive offers elsewhere. As a result, the Department is again well staffed with able young men in whom the Committee has entire confidence. Largely through the efforts of Bradley Dewey, '09, chairman of the previous Committee, the Department is now occupying and enjoying the full use of the new Chemical Engineering Building, which for the first time gives it a well-designed and integrated set of offices, laboratories, shops, and other facilities needed for Chemical Engineering instruction and thesis work. These facilities will permit the Department to handle at least 20 per cent more men than was possible with the prior setup and to do so with much greater efficiency.

There were three specific questions on which the opinion of the Committee was solicited. These questions and the recommendations of the Committee are as follows:

(1) Should the various Courses, such as Chemical Engineering, for which the demand is unusually heavy, be permitted to place limitations on the number of those entering the sophomore or junior year of these Courses, as was the practice before World War II?

In present circumstances, when the Institute as a whole is required to impose very severe restrictions on the num-

(Continued on page 48)

\* Members of this Committee for 1945-1946 and 1946-1947 are: Robert E. Wilson, '16, chairman, Lammot du Pont, '01, John W. Livingston, '13, George O. Curme, Jr., and Harry C. Wiess. Percy C. Keith, Jr., '22, and William Welch were also members for 1945-1946. Charles A. Thomas, '24, and Frederic W. Willard are on the Committee for 1946-1947.



GENERAL  ELECTRIC

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**GENERAL  ELECTRIC**

## THE INSTITUTE GAZETTE

(Continued from page 46)

ber of entering students, the Administration has not favored the reinstatement of prewar limitations on the numbers who would be permitted to take the more popular courses. As a result, the Chemical Engineering Department currently has about 70 per cent more students than it had before World War II, whereas its facilities were increased by about 20 per cent. The unusually large enrollment in Chemical Engineering this year has not constituted an undue burden because most of the increase is in the lower classes, whose numbers are taking relatively little professional work and no thesis work. If, however, this rate of increase is allowed to continue, the Department and the Committee believe that it will seriously impair the quality of the work the Department is able to accomplish. Just as the Institute must limit its numbers to keep from being overwhelmed, the Committee believes that the individual Departments should be permitted to impose reasonable restrictions on the number entering their Courses, giving due weight to the emergency situations confronting M.I.T. in common with all educational institutions. By channeling more students into the less crowded courses, a limitation on the number of students to be enrolled in especially popular courses might provide a means by which M.I.T. could efficiently accommodate a larger number of students.

(2) After the present emergency peak has been passed, does the Committee favor limitation of the number of the students in the Department to the number for which the

present buildings were designed (representing an increase of 20 per cent beyond prewar enrollment)?

While staff members of the Department were inclined to favor such a postemergency limit, the Committee is of the opinion that both the supply of qualified students and the demand for M.I.T. Chemical Engineering graduates will be at least double the prewar demands for many years to come. Even this does not include prospective expanded demands for graduate courses from foreign sources and from our own Army and Navy. The Committee recognizes that there are advantages in limitation of size which enable a closely knit group of men to develop better *esprit de corps*. At the same time, the Committee feels that the Department will not be doing the best over-all job it can for prospective students (or for science and industry) if it does not make its plans to care for more than a 20 per cent increase from the prewar levels. The serious difficulty in securing the capital funds for expanding the facilities of this and other departments of the Institute is recognized by the Committee. It is suggested that by using certain facilities for a larger number of hours during the day, by making provision for fuller operation of the Institute facilities during the summer, and with necessary expansion of the staff the Department can provide outstanding Chemical Engineering education to a substantially larger number of students than the proposed 20 per cent increase above prewar numbers. The day has probably passed when there is justification for operating the very expensive facilities of our technical schools on the basis of seven or eight hours a day, in many cases for only 36 weeks a year, although teaching must not be adversely affected by more efficient use of physical facilities.

(Continued on page 50)

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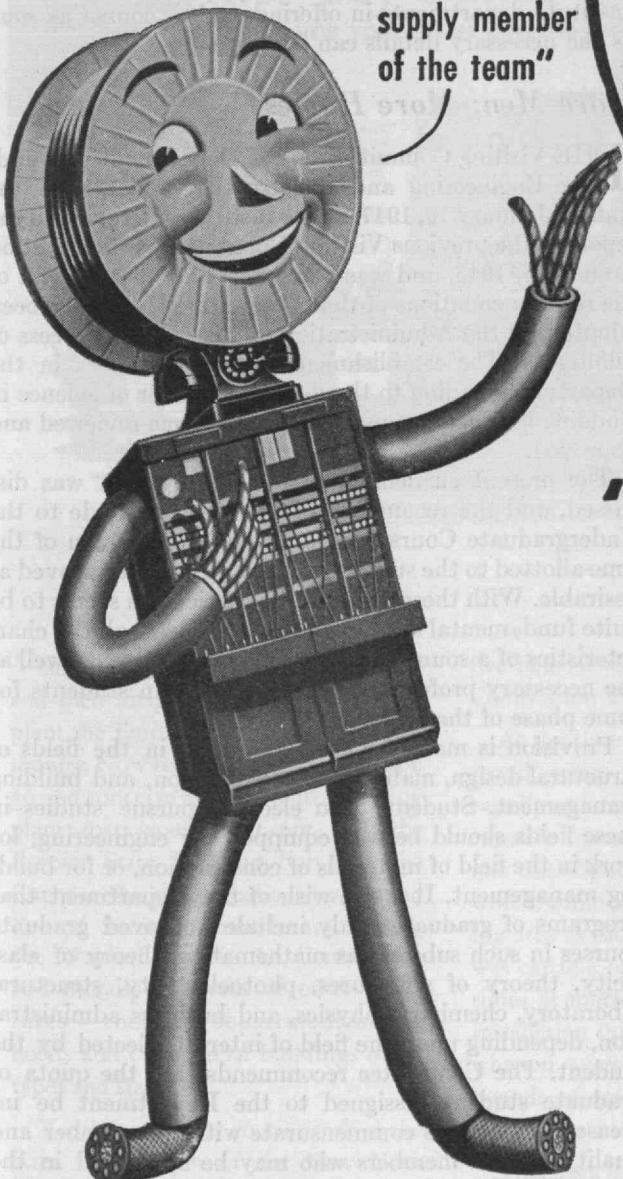
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**THE INSTITUTE GAZETTE**

(Continued from page 48)

(3) Should the Department of Chemical Engineering co-operate with other departments in establishing a graduate course in nuclear engineering? Such a course would probably combine several months of specialized training with a practice school type of work in connection with a plant such as Oak Ridge, or Hanford, or possibly with one of the regional nuclear laboratories.

After considerable discussion, and with the concurrence of Charles A. Thomas, '24, who is particularly familiar with these fields, the Committee recommends that the Chemical Engineering Department co-operate with other Institute departments in offering such a course as soon as the necessary details can be worked out.

**More Men; More Homes**

THE Visiting Committee on the Department of Building Engineering and Construction \* met with the staff on January 10, 1947, at the Institute. It reviewed the report of the previous Visiting Committee, which met on January 3, 1945, and was pleased to find that several of the recommendations of that Committee had either been adopted by the Administration or were in the process of fulfillment. The establishment of graduate work in the Department leading to the degree of master of science in Building Engineering and Construction was reviewed and approved.

The present curriculum of the Department was discussed, and the recommendations recently made to the Undergraduate Courses Committee for extension of the time allotted to the subject of materials were approved as desirable. With these changes the curriculum seems to be quite fundamental and broad and to possess all the characteristics of a sound, basic engineering course, as well as the necessary professional subjects to train students for some phase of the building industry.

Provision is made for graduate study in the fields of structural design, materials of construction, and building management. Students who elect to pursue studies in these fields should be well equipped for engineering, for work in the field of materials of construction, or for building management. It is the wish of the Department that programs of graduate study include approved graduate courses in such subjects as mathematics, theory of elasticity, theory of structures, photoelasticity, structural laboratory, chemistry, physics, and business administration, depending upon the field of interest selected by the student. The Committee recommends that the quota of graduate students assigned to the Department be increased in so far as commensurate with the number and quality of staff members who may be appointed in the future. The Committee feels it is highly desirable that the Administration give due consideration to such expansion when it is needed.

The increase in registration in the Department follows a general pattern of increase in all Departments at M.I.T.

(Continued on page 52)

\* Members of this Committee for 1946-1947 are: Harry J. Carlson, '92, chairman, John H. Hession, '13, Percy Bugbee, '20, Francis A. Barrett, '24, Thomas D. Cabot, Lou R. Crandall, and Henry R. Shepley.

# History-making boiler plants

**No. 3**  
**Kips Bay Station —**  
 NEW YORK STEAM CORPORATION

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Visualize a typical home-heating boiler and then imagine the kind of heating plant the Empire State Building would require. Now really let your imagination go and conceive a single central heating plant that would heat not only the Empire State Building but also the Chrysler Building, Radio City, Grand Central Station, Pennsylvania Station, the Waldorf-Astoria, the Commodore and literally hundreds of other structures — theaters, department stores, hotels and commercial buildings of all types and sizes.

At the time the fifth boiler was projected, steam demand was increasing rapidly and the objective was maximum capacity from the available space. C-E met this objective by designing a boiler which, while occupying the same building area as each of the original boilers, was capable of producing nearly three times as much steam. Shortly after its installation this boiler set a new record when it averaged more than 800,000 pounds of steam per hour for a full month of continuous operation.

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Yet that job is the routine task of the Kips Bay Station of the New York Steam Corporation . . . the largest central heating plant in the world.

Perhaps the most surprising thing about Kips Bay is that it does its huge job with only five boilers . . . three were installed in 1926 when the station was built, the fourth went into service a year later and the fifth in 1930. All

*These three factors are the unwritten plus-values in every C-E contract —*

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## THE INSTITUTE GAZETTE

(Continued from page 50)

The Committee calls attention to the fact that the demands for graduates with the training provided by the curriculum will be high for quite a number of years because of the tremendous backlog of construction work. Because of present trends of construction it is highly desirable that a considerable number of trained men be fed into the industry from courses such as this. To do this means that the quota for the Department be raised to 20 or 30 per year and held at not less than 20 for some time to come. This in turn will, of course, mean some increase in staff as soon as competent men can be found. The Committee is particularly impressed with the fact that the present staff combines technical training with practical experience to a high degree, and any additions to the staff should continue that trend.

A review of the departmental research projects indicates that the staff is cognizant of the fundamental importance of research in the fields of materials and methods. It is hoped that open researches of the type now being conducted by the staff in the Department will continue, so that the Institute may be a place of advanced study in the various fields of the industry.

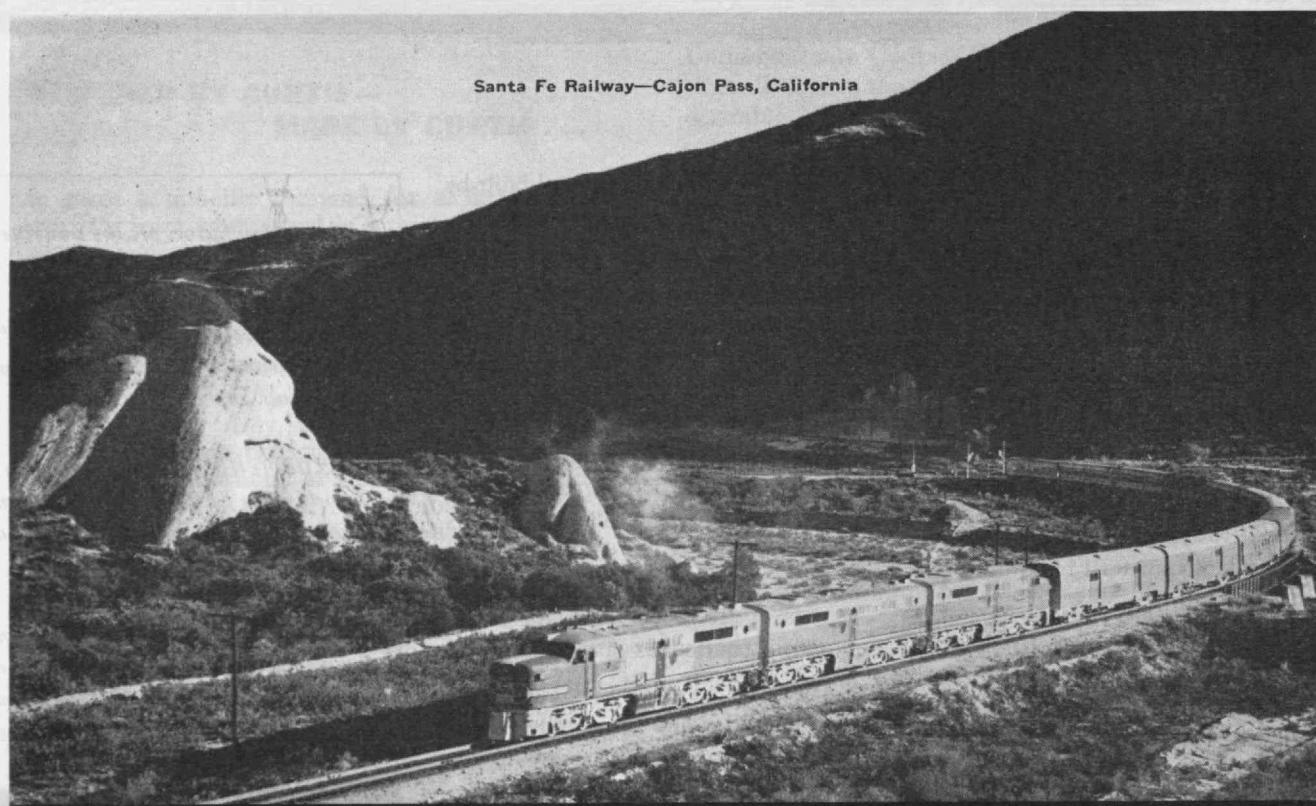
The Committee reviewed the space requirements in the Department as presented to the Administration under date of November 15, 1945, with subsequent revisions. With increased registration and the growth of graduate work it is important that the suggested space require-

ments be given consideration. The Committee recommends that the masonry materials research laboratory be expanded as soon as possible. With the expansion of enrollment it is highly desirable that additional space be made available for drafting purposes. The plastics materials research now being carried on in a temporary building is a continuing study which will justify the establishment of permanent space. The Committee assumes that the Administration is aware of these suggested space requirements for the Department and urges that they be given careful consideration.

It has been the intention of the Department, as reviewed by several Visiting Committees, to attempt the inception of a building construction and materials exhibit somewhere on the property of the Institute. The Committee is sympathetic with the general purpose of such an exhibit and suggests that it include not only actual construction projects for the training of students but also areas in which materials and their uses (as well as various details in the accomplishment of certain objectives) be exhibited. Usefulness of this exhibit to the students in Courses I, IV, and XVII, as well as to the architects, engineers, and contractors of Greater Boston, and to the general public, cannot be overlooked. Such an exhibit under the management of the Institute would be highly desirable. The Committee felt that the actual cost of constructing and furnishing materials and labor for the building and the exhibits therein could, and should, be carried by industry, but that the Institute should make land available as well as furnish the light, power, and general supervision of the project once it has been started.

(Continued on page 54)

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Continuity of operating experience is provided by Chief Engineer Carl A. Baehr, who has been with the new Delaware Hospital from the beginning. Let Mr. Baehr tell you about some of the heating economies.

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"Sometimes an unusual amount of heat is required in a particular room for a limited time. Instead of turning the Variator to full heat with consequent overheating of other rooms, we remove the Webster Metering Orifice from the radiator supply valve in less than three minutes. Later it is replaced."

The Delaware Hospital was only partially completed at the time fuel rationing went into effect. It was estimated that the completed Hospital would require 620,000 gallons of fuel oil per year. Based on this estimate, the fuel rationing board allotted 500,000 gallons of oil per year for all purposes—heating, steril-

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izers, laundry, kitchen equipment. Fuel consumption records show that the Hospital did not require a supplementary ration at any time during fuel rationing. The Webster Moderator System saves fuel by keeping radiators comfortably warm. Instead of 212 degrees, the average surface temperature of radiators is 185 degrees, 150 degrees or even as low as 90 degrees, depending on the need for heat.

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"Control-by-the-weather"

## THE INSTITUTE GAZETTE

(Continued from page 52)

The Committee recommends that the Administration consider the initiation of such a project.

The importance of placement training for the students in this Department was again discussed and stressed by the Committee. The Committee recommended that steps be taken as promptly as possible to set up contacts for such training during the summers between the academic years. It was pointed out that the curriculum calls for attendance at summer camp between the second and third years of the Course. This makes only the summers between the freshman and sophomore, and the junior and senior years available for this type of work. However, this plan works well with the requirements for the Reserve Officers' Training Corps camp, which is scheduled the first half of the summer between the second and third years. Inasmuch as students are not normally required to indicate their choice of courses until they register for the first term of their sophomore year the summer between the freshman and sophomore year does not present as feasible a period as could be wished for placement training. Nevertheless, the Committee recommends that the Department set up placement training between the freshman and sophomore years for those students who indicate their interest in such training when enrolling in the Department during the freshman year. The main portion of placement training would have to be given in the sum-

mer between the junior and senior years and the plan which the Department followed prior to World War II should be enlarged in its scope until it becomes possible to require one summer of such placement training as a part of the curriculum.

The Committee visited the Solar Energy Building, the Building Materials Laboratories, and the Plastic Research Laboratories, and was impressed with the fundamental character of the work being done in these fields. It is hoped that other research projects similar to those viewed will be arranged for in the future.

### New Concept of R.O.T.C.

THE desirability of making some changes in the Reserve Officers' Training Corps program, with a view to effecting better co-ordination of the educational programs and aims of the educational institutions with those of the Reserve Officers' Training Corps, was discussed at length when the Visiting Committee on the Department of Military Science and Tactics\* met with officers of the Institute and of the Department at the Harvard Club of Boston on the evening of December 2, 1946. Thus the Committee gave consideration to Reserve Officers' Training Corps matters of national scope, as well as to the more specific problems at M.I.T.

(Continued on page 56)

\* Members of this Committee for 1946-1947 are: Thomas C. Desmond, '09, chairman, Frederick S. Blackall, Jr., '22, Colonel William F. Heavey, '22, Colonel Benjamin S. Kelsey, '28, Lieutenant General J. Lawton Collins, J. Willard Hayden, and Major General Horace L. McBride replacing former member Major General Ira T. Wyche.

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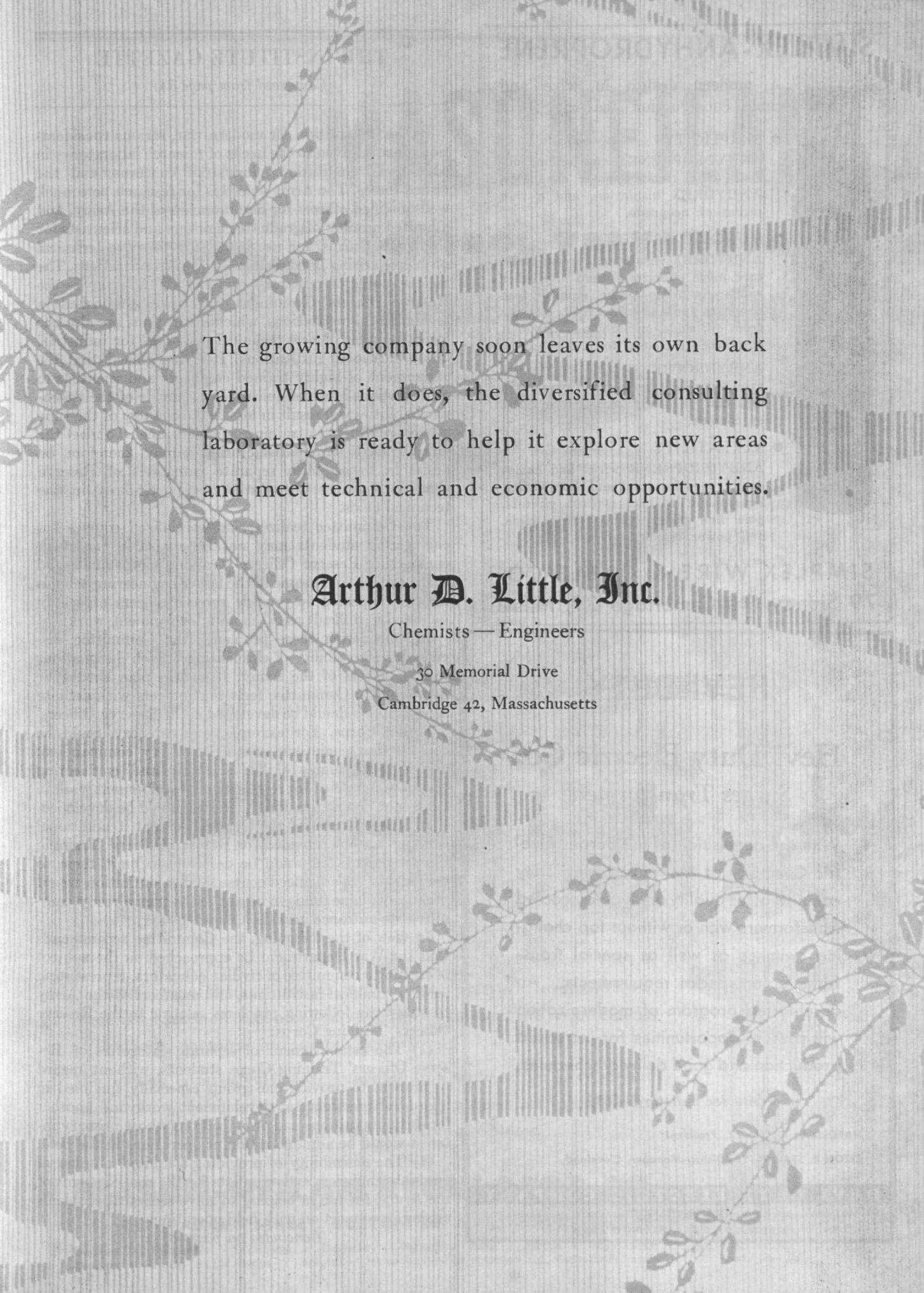
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# THE INSTITUTE GAZETTE

(Continued from page 54)

In the preparation for modern war, serious consideration must be given to the needs of research laboratories in educational institutions, industrial concerns, and the armed forces. The Army's need is for research personnel, well-qualified officers for line branches of the Army, and a limited number of graduate engineers and scientists for the combat arms, for use in helping to solve technical problems arising in connection with field operations. The logical source of research personnel for the Army is the Reserve Officers' Training Corps units established in technological institutions, which institutions are also the logical sources of new technical personnel for industrial and educational institutions. It is recognized that the assignment of highly trained engineers and scientists to organizations in which full use is not made of their technical abilities will result in loss to the country of the time and energy spent in training such personnel. To meet the Army's needs more satisfactorily, it may, therefore, be desirable to establish separate categories of Reserve Officers' Training Corps students, particularly in the technical fields.

The Committee realizes that specialized courses for engineering students may not be advisable for every engineering Reserve Officers' Training Corps unit, and that probably only some of the larger engineering schools may be expected to provide reserve officers especially qualified in difficult research and development work.

In considering these problems, the Committee discussed the possibility of eliminating branch designations for all officers of the Army. If such a plan should be adopted, the Committee feels that officers with definite specifications should be developed in the Reserve Officers' Training Corps. For example, one category could be construction engineers; another, artillery commanders; and a third, highly skilled scientific and engineering graduates qualified for research and development work in fields in which war-making matériel should be developed.

It is the opinion of the Committee that if additional emoluments are provided for Reserve Officers' Training Corps students, it would be desirable to limit them to students in the advanced course. Such a limitation would permit available funds to be applied to men already committed to entrance into the Corps.

In view of the foregoing, the Committee recommends that the War Department be approached on the subject of forming a committee of civilian educators, representing leading technical institutions, and members of the Army to study the following problems relating to the Reserve Officers' Training Corps:

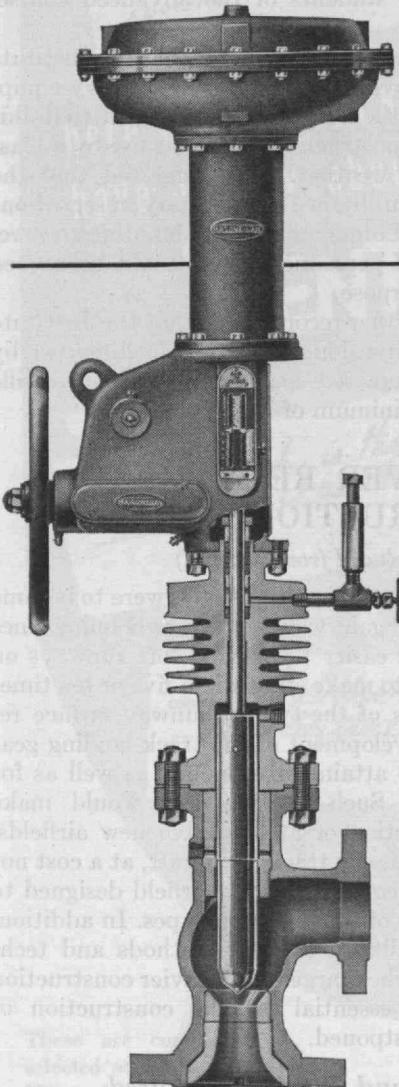
(1) The establishment of separate categories of Reserve Officers' Training Corps students, without regard to branch, to provide one group especially qualified in high-level research and development work and another for duty in positions and organizations whose primary interest would be administration or operations in the field.

(2) The desirability of providing a limited number of graduate engineers and scientists for the combat arms of the Army, for use in helping to solve technical problems arising in connection with field operations.

(Concluded on page 58)

# MASONEILAN

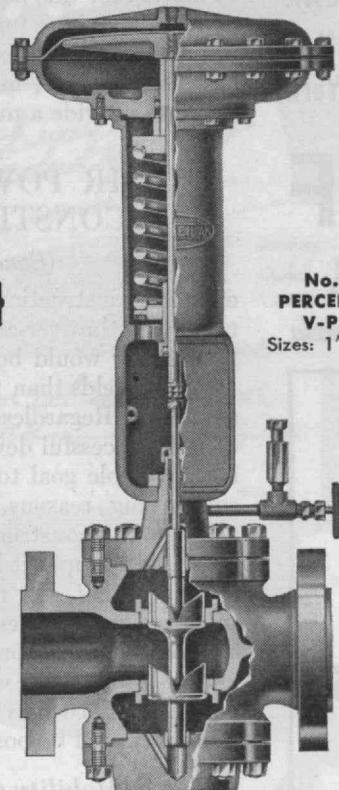
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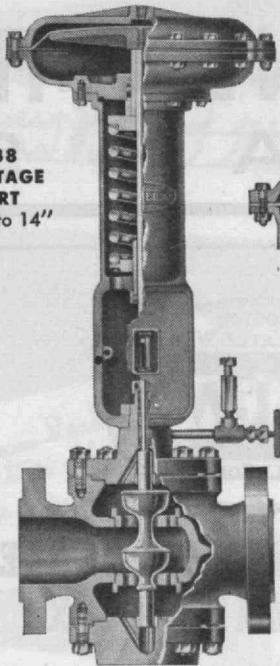
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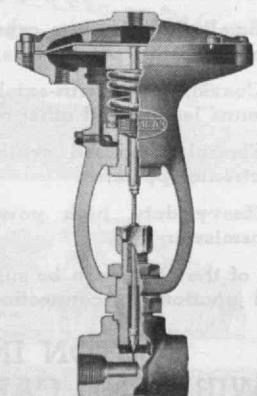
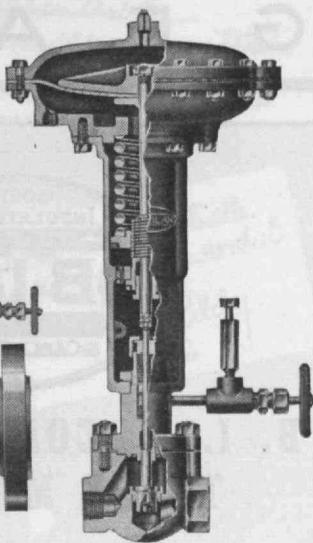
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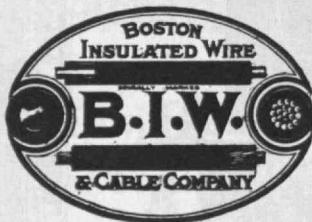


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## THE INSTITUTE GAZETTE

(Concluded from page 56)

(3) The development in the Reserve Officers' Training Corps of officers with definite specialties, should branch designations be eliminated from the Army.

(4) The proper application of any increased emoluments for Reserve Officers' Training Corps students, by limiting such aid to students of the advanced course, senior division.

The Committee further recommends that the Institute make an effort to provide storage space for heavy equipment to be used in the advanced course, and that this space be of suitable construction to permit use by a class in cold or inclement weather. It is suggested that the Institute endeavor to obtain from military reservations in the First Service Command surplus buildings not required for housing of personnel, which could be moved to M.I.T. for this purpose.

The Committee further recommends that the Institute provide, either by extension of existing facilities, or by new construction, increased space in the Institute rifle range to provide a minimum of 10 firing points.

## AIR POWER RELATED TO CONSTRUCTION POWER

(Concluded from page 28)

even if reconstruction of existing facilities were to become necessary, the over-all gain would be overwhelming since it certainly would be easier to provide soft runways on all our airfields than to make all of them five or ten times as strong. Regardless of the type of runway surface required, successful development of the track landing gear is a desirable goal to attain for economic as well as for engineering reasons. Such landing gear would make possible the construction of at least five new airfields, adequate to support heavy tracked aircraft, at a cost not exceeding that now required for one airfield designed to support heavy planes of conventional types. In addition, airfields could be built by existing methods and techniques, and the day when larger and heavier construction equipment becomes essential for the construction of airfields would be postponed.

### *Mobility and Flexibility Insured*

In summary, expanding air power depended upon and was made possible by increasing construction power employed in its direct support. In the future, factors of strategy and economy are likely to force the development of even larger aircraft, wherein the limiting factors appear to be related to pavement, tire, and landing-gear problems. Until these problems are solved, the mobility and flexibility of our strategic air arm will be restricted. The solution appears to lie in concentrating aggressive research on the development of stronger and more durable pavements, and improved landing gear for aircraft; and in maintaining, within the regular and civilian components of the United States Air Force, a construction organization second to none in professional competency, and capable of accomplishing the rapid construction of suitable air bases on our strategic frontiers when, and if, needed.

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Boston, Mass.

Comments: As essential to a car as traffic lights.  
Have one in my oil tank.

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## RESEARCH FOR EDUCATION

*(Concluded from page 31)*

from academic duties to undertake the research. Out of approximately 200 academic staff members working part time on sponsored research, less than 20 are receiving supplementary compensation. Those who receive this extra compensation agree, for the period they receive it, to forego their privilege of engaging in outside consulting.

### *Other Sponsored Research Policies*

Other more detailed tests which are applied to sponsored research at M.I.T. include the following:

(a) Some department or group of departments (or an academic organization such as the Research Laboratory of Electronics) must be willing to accept responsibility for the project and must have available senior staff members who are free and willing to oversee the project. Contract research is thus under the jurisdiction of the academic departments.

(b) It must be possible to staff the project in accordance with the Institute's prevailing personnel policies.

(c) It must be possible to staff the project without handicapping the educational program either by overloading the staff or by diverting from the educational program the proper amount of attention and interest.

(d) The project must come within the volume of research (measured in dollars, space, personnel, and required amount of administrative attention) which the Institute can appropriately undertake. It must fit into a balanced over-all program and it must be of sufficient importance and interest to be taken into the Institute.

(e) Final approval of the project rests with the academic dean who has jurisdiction. If the project is borderline and the dean has doubts whether it meets the tests and principles laid down, he will bring it before an administrative committee composed of the president, the vice-president, the dean of engineering, the dean of science, and the director of the Division of Industrial Coöperation.

Reduced to a single statement, these principles say in effect that the consideration, acceptance, and priority of any sponsored research project are governed by the extent to which the proposed activity will carry forward the educational objectives of the Institute. Only under conditions of great emergency will projects be accepted which do not contribute to the advancement of educational objectives or of scientific knowledge or of engineering art. We believe that only by strict adherence to these principles can a large volume of sponsored research be undertaken and still retain the integrity of M.I.T.'s educational program. We believe further, however, that sponsored research can be carried out in conformance with these general principles.

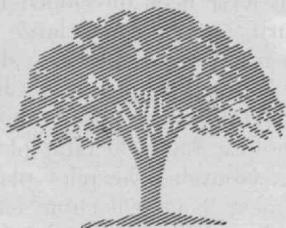
In conclusion I would reiterate that research, aimed at advancement of knowledge or development of its practical applications, is both a method of advancing knowledge and a method of teaching and that it must be both when carried on in collaboration with students. In meeting this educational test our research programs must also help to create that subtle kind of environment where scholarship and creative activity flourish and great minds feel at home. The creation of this environment is a major task of our engineering institutions.

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## OXYGEN FOR INDUSTRY

(Continued from page 35)

gasification to possible large-scale commercial realization in the United States. Interest lies both in the manufacture of gas at mine mouth with a volumetric heating value high enough to warrant pipe-line transmission, and in the utilization of coal for the production of "synthesis gas" to be converted into liquid fuels. Utilization of the principle of the fluidized catalyst bed, developed in the United States ("jiggle" as the devotees call it), seems likely to play an important part in both the coal-gasification and the conversion stages of these developments and is already being extensively studied in pilot-plant operations.

Progress in methods for producing low-cost, high-purity oxygen is of much more than academic interest, and already plans have been developed to manufacture low-cost, high-purity oxygen on a large scale. It is reported that, as a result of co-operative studies made by the Standard Oil Company of New Jersey and the Pittsburgh Consolidation Coal Company,<sup>8</sup> these companies plan to build a \$300,000 pilot plant at Library, just outside of Pittsburgh. The pilot plant will have a daily yield of almost 2,500,000 cubic feet of gas from about 50 tons of coal. In the development of their Hydrocol process for economically producing natural gas from gasoline, Hydrocarbon Research, Inc.<sup>9</sup> also plans to produce about 40,000,000 cubic feet of high-purity oxygen daily by separation from air. The Synthol projects, Carthage Hydrocol, Inc. and Stanolind Oil and Gas Company, are also expected to be in operation soon.

While all this is happening aboveground, fires are burning underground in experiments on the conversion of coal to gas without mining. The Russian experiments, frequently in the press, have successfully used the alternating "blow with air — run with steam" technique of the water-gas process. Experiments in this country are being conducted by the Bureau of Mines and the Alabama Power Company at the Gorgas Mine near Jasper, Ala. After the general technique has been worked out, cheap oxygen might well be the key to the successful commercial operation of such underground gasification projects. Already it has been found that oxygen-enriched air improves the producer-gas type of operation being studied in Alabama.

## Other Possibilities

Important as they may turn out to be, these schemes for coal gasification both above and below ground will not solve all of coal's problems, since without extraordinary transformations in our economy, solid coal will still be required for running most of the railroads, for making coke with which to make iron and steel, and for other fuel uses at locations not economically reached by gas pipe lines. New methods of mining are being studied to help solve some of the other problems, and while oxygen will not be involved directly, the resulting lower-cost coal may affect processes in which cheap oxygen will play a role.

(Concluded on page 64)

<sup>8</sup> "Coal," *Fortune*, March, 1947. Bland, William F. "Gasification of Coal May Foreshadow New Industry Replacing Oil Refineries," *National Petroleum News*, April 2, 1947.

<sup>9</sup> Keith, P. C., "Gasoline from Natural Gas," *Oil and Gas Journal*, June 15, 1946, p. 102.



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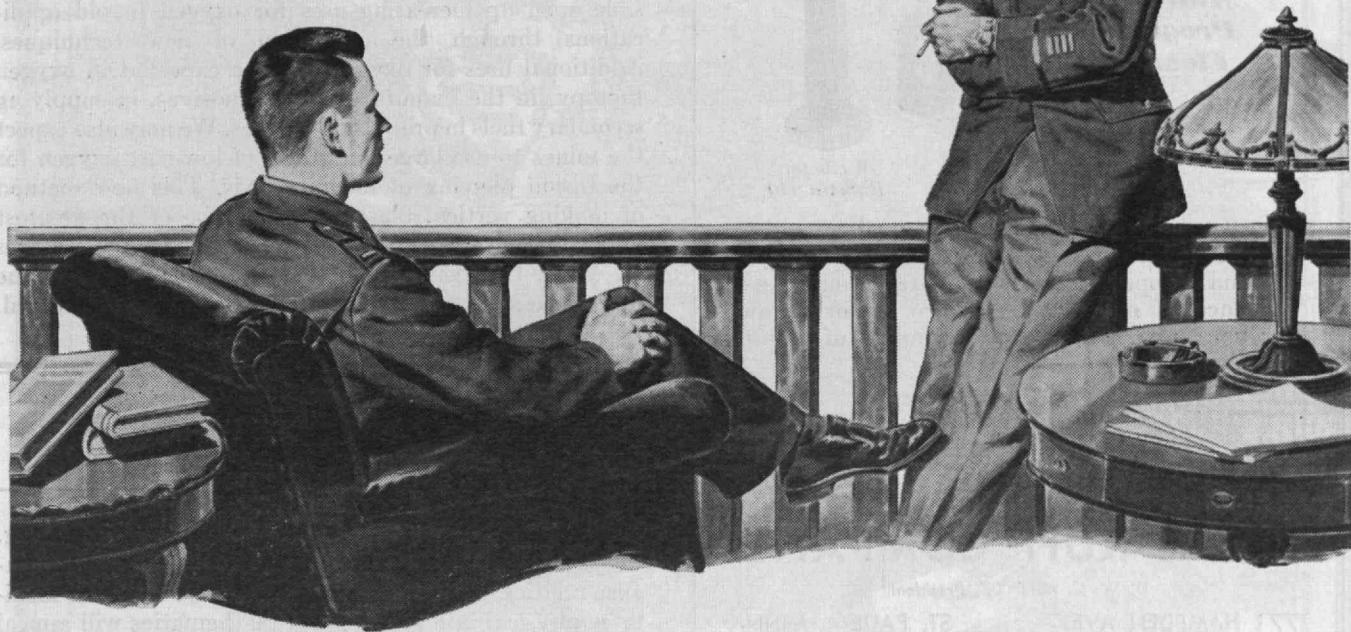
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# He gave me a \$64 answer!



I met this particular Major at "Willow Run"—that gigantic officers' mess in the Grosvenor House hotel in London.

He had just come back from duty in Germany, and we happened to relax near the same sofa on the balcony lounge. After the usual Army talk, the conversation sagged. To fill in, I asked him what he had done in civilian life.

I expected a one-word reply—but I got a \$64 answer.

"I started out as an accountant," the Major said. "Worked at it for six years, but I was getting nowhere—and too slowly. So I decided I'd better dig in and figure out the next move. Being the methodical type, I wrote down my specifications for the ideal job. Well, first I wanted to be my own boss and be able to knock off for a little sailing or fishing when I felt like it. Then, I wanted my work to pay off to me in person. And I didn't want any slow moves up a ladder, or a business that needed a big investment to start."

"Doesn't that sound sort of impossible? But I stuck at it and checked off a long list of careers against my specifications."

"Only one job promised to fill my bill. It was—to my complete surprise—life insurance. Now I had never sold

anything, mind you, but if selling was the one way to a combination of freedom and income, I would certainly try it. My company gave me a practical training course, and within a year I made just twice what I figured I'd be lucky to be making by that time. A good week of work meant good checks, and the renewals made every week's work pay off for years afterwards—something that's coming in mighty handy for my family right now while I'm away."

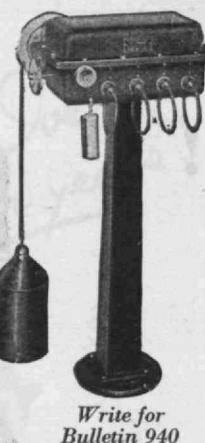
"That's how I got what I wanted. But oddly enough, it was something I hadn't planned on at all that made my job the best one in the world for me. It was the conviction that I was helping other people get what they wanted . . . independence, security. If you could visit just one of the families that are now living comfortably because of the life insurance I sold a young father, you'd know what I mean."

• • • • •

**P.S.** Perhaps the Major's story can answer some of your career questions. It is typical of many service men who are now back with New England Mutual. For more facts and figures, write Mr. H. C. Chaney, Director of Agencies, New England Mutual Life Insurance Co., 501 Boylston St., Boston 17, Mass.

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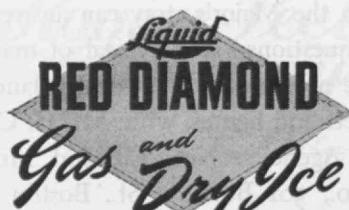
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## OXYGEN FOR INDUSTRY

*(Concluded from page 62)*

Of necessity this survey has been confined to a review of the larger new prospective uses for oxygen in industry. But many other important, if smaller scale, uses for this gas will undoubtedly be developed when oxygen of high purity is commercially available at low cost. The lower cost and high purity which modern methods make possible open up increasing uses for oxygen in old applications through the perfection of new techniques. Additional uses for oxygen may be expected in oxygen therapy, in the manufacture of explosives, in supplying secondary fuels in propulsion devices. We may also expect the mines to use large quantities of low-cost oxygen for the fusion piercing of taconite beds. This new method of making vertical blast holes may be of the greatest importance in the commercial use of the iron ore reserves on which this country may have to depend when the more accessible ores of the Mesabi Range are exhausted.

## THE TREND OF AFFAIRS

*(Concluded from page 23)*

education and research studies are highly intriguing. Certainly any means which furthers the ability to visualize relationships expressed analytically, or which facilitates physical interpretation of mathematics will appeal to students of science and engineering.

Research attained an all-time high during the war when 2,250 laboratories financed by private enterprise were in operation. The full weight of the results of research thus conducted is not expected to be felt for several years. Most of the development was carried out by large firms whose products and processes will probably undergo substantial changes during the next few years. But when better and more useful products become available, the consumer, and those who carried out research, will be among those to gain most by past investigations.

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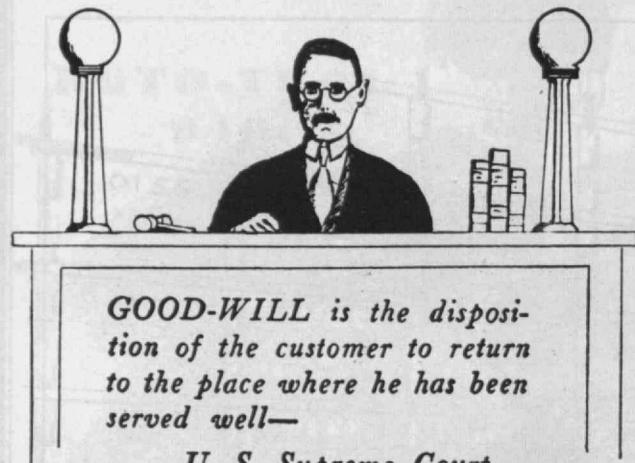
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## COLLOIDS IN SCIENCE AND INDUSTRY

(Continued from page 37)

reaction of the silver ions with the bromine ions located in the surface of the particle, as shown in Fig. 1. Now it is exactly this phenomenon which is the basis for many very important industrial processes and applications.

A few examples are here pointed out. The surface charges which are carried by most dust particles, or small liquid globules, are used to good advantage to purify the air which otherwise would escape through the chimneys of industrial plants. Removal of smoke, dust, or other fine particles is accomplished by setting up a high potential electrostatic field in the chimney. The electric field is created by placing one electrode in the center of the chimney and the other electrode on the inside of the flue, and then applying a steady high voltage between these electrodes as illustrated in the diagram of the Lodge-Cottrell precipitator, Fig. 2. Flue particles which have a positive surface charge are collected at the cathode (or negatively charged electrode) whereas oppositely charged particles are collected at the anode. The removal of colloidal particles by this method is quite effective.

If a sheet of nickel is brought into contact with oxygen and carbon monoxide at a slightly elevated temperature nothing astonishing will happen. If the nickel is in the form of colloidal powder, however, carbon dioxide is formed by a process which chemists call heterogeneous catalysis. Again, as indicated in Fig. 3, it is the surface charge of colloidal particles which is responsible for formation of the new compound. A solid piece of coal placed in the mouthpiece of a gas mask would offer no protection to the person wearing it during exposure to poison gas. But if only a fraction of the carbon is used in the colloidal state, protection against poison gas can be achieved for several hours. As indicated by Fig. 4, the greatly increased surface of colloidal carbon particles is capable of removing particles of poison gas by virtue of the surface charges for the two particles. The effectiveness of certain clays and many synthetic resins, used for various purposes of purification, is based on the same phenomenon. The lives of many men, forced to abandon ships or planes at sea, have been saved by supplying them with cartridges filled with such substances through which sea water could be passed and made drinkable.

### *Seeing Is Believing*

In the strictly scientific field colloid chemistry has also some very interesting and important contributions to report. Probably the most exciting and possibly far-reaching one is the application of a new ultramicroscopic technique in the study of elastic colloids, such as rubber and the synthetic plastics. This new development, which originated at M.I.T. and on which efforts are now being continued in collaboration with the Midwest Rubber Reclaiming Company, is based on work done several years ago with the electron microscope in the Institute's Department of Biology in collaboration with the Department of Chemical Engineering. The new technique, in which incident light is applied to an ultramicroscope, as shown in Fig. 5, permits direct visual or photographic study of the effect of time and temperature on substances exhibiting elasticity either at normal or at elevated temperatures. The changes which take place with time in

(Concluded on page 68)

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## COLLOIDS IN SCIENCE AND INDUSTRY

(Concluded from page 66)

a sample of rubber, for example, are illustrated in the series of photomicrographs of Fig. 6. Changes taking place as a function of temperature are illustrated by the two photomicrographs of gutta-percha in Fig. 7.

When, as in the technique just described, it is possible to study microscopic changes in substances occasioned by changes in time, temperature, and other physical quantities, and when it is further possible to correlate observable changes with knowledge of the chemical composition

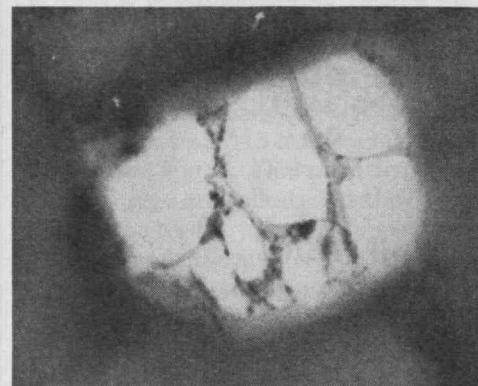
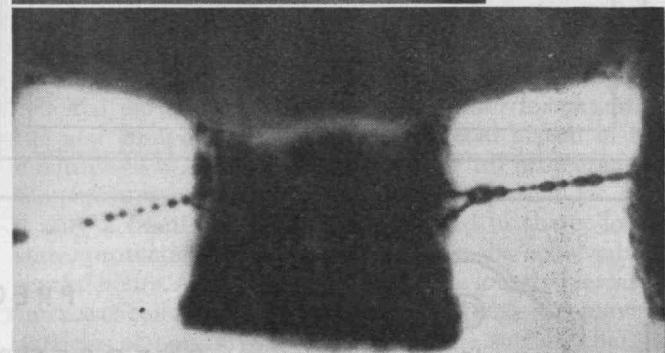


Fig. 7. Temperature effects on gutta-percha are illustrated by these photomicrographs made at 25 degrees C. (left) and at 65 degrees C. (below).



of the substance under investigation, it is logical to anticipate important advances from such research methods. Our anticipations find ready confirmation in recent studies. For example it has been possible to prove conclusively that elasticity is due to a well-balanced distribution of different molecular weight fractions of the same compound, or to the mixture of two compounds, one of which acts as a solvating agent for the other. Based on these findings, the successful synthesis of useful elastic compounds has already been accomplished. Such results, however, are to be regarded merely as the beginning of an entirely new field of colloid research.

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## SAFELY THROUGH ROUGH WATERS

(Concluded from page 38)

with a tremendous problem of navigating safely through the rough waters that have followed the storm. What we must all hope and pray and strive for is that we may navigate safely until, with time, the sailing has again become smooth, and we must all hope, pray and strive to prevent the outbreak of still another storm.

I think that the most important lesson which we can gain from this analogy is that the victory was not won with the advent of V-E Day and V-J Day, and that we cannot relax in our efforts, or relax our vigilance, or cease our sacrifices just because the wind has stopped blowing. We still have to navigate the waves, and to do so successfully will require the same patriotic zeal, sustained effort, and willingness to make personal sacrifices which enabled us successfully to ride through the storm of the war itself.

As you now go your various ways from the Institute and into the wide variety of careers before you, may you do so with faith and enthusiasm. There is no time like an emergency to create opportunities for a good man. You are actually and potentially good men, for you are a selected group who have had an unusual educational opportunity and have come through it successfully. If, added to your native ability and your educational training, you have faith and enthusiasm, and a sustained ambition to play a constructive role in these critical times, in whatever line of activity you may pursue, you will perform a much needed service in our postwar society and will win for yourselves success and satisfaction.

So, on behalf of the Faculty and the Corporation, I bid you Godspeed. If I may be permitted to speak on behalf of our Alumni Association, I welcome you to it. I assure you that the Institute and all connected with it will continue their desire to be helpful. Take advantage of this help by maintaining in various ways your contacts with M.I.T. and with your associates in class and Faculty. We shall follow your careers with interest and, I trust, with pride.

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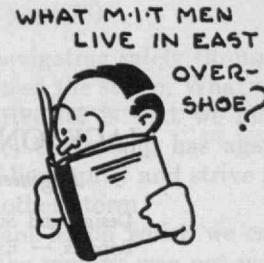
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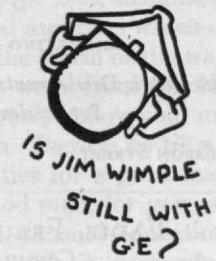
## ALUMNI REGISTER

Massachusetts Institute of Technology



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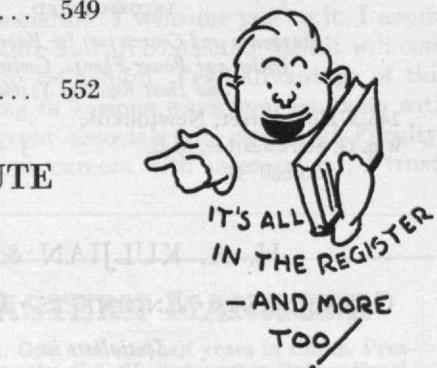
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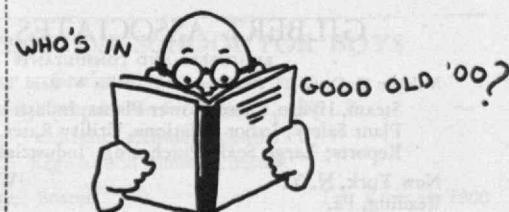
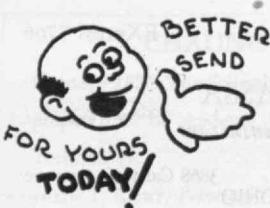
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# TECHNOLOGY MEN IN ACTION

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THE ALUMNI FUND — ITS PROBLEMS AND GROWTH

---

## Investment Opportunity

By mid-October the 1947-1948 Alumni Fund was in its seventh month. Although the fund year does not come to a close until March 31, results by that time gave some indication of where this eighth year is heading.

Most encouraging indication of progress was the increase in size of the average contribution. During our first year that figure stood at \$8.30, very little more than the \$5.00 needed for dues, so called, including The Review subscription. Last year at this same time the average was \$16.60. Today it is \$18.40, an increase of almost \$2.00, or some 11 per cent.

Actual figures as of October 9 were 8,068 contributors (almost the same as last year at that time) and \$148,316, an increase of some \$12,500.

It is a good start. If all who gave last year do so again, it will be a year to be remembered. You were one of those who made 1946-1947 outstanding. If your name is included with the 8,067 other Alumni already in, you have the sincere thanks of the Institute and of all who are charged with the responsibility of operating our Fund. If you have not yet responded, won't you do so now? It is your opportunity to participate actively in one of the most potent forces in American education today — to invest in the future, not only of M.I.T., but of science and technology, fields in which continued progress is essential to our national welfare. It is an opportunity which Technology Alumni are uniquely qualified to appreciate and evaluate.

## M.I.T. MEN AT WAR

According to Alumni Association records, 9,900 Institute Alumni, including 38 Admirals, 14 Commodores, and 101 Generals, were reported as being in the active naval or military service of the United Nations. There were 597 Alumni who had been decorated, and 229 who had made the supreme sacrifice.

With its issue dated November, 1942, The Technology Review began publishing "M.I.T. MEN AT WAR." Although hostilities have ended, The Review plans to continue this page for the next several months in order to record information on M.I.T. men in the Services which, to date, has been impossible to obtain. The Review Editors are greatly indebted to the many Alumni and other readers who are continuing to co-operate so helpfully in reporting inevitable errors of omission and commission which they note in these listings.

## NEW LISTINGS

## U.S.A.

1916 Clarkson, Edward H., Jr., *Lt. Col.*  
 1919 Carter, John S., *Lt. Col.*  
 1922 Epstein, Nathan I., *Capt.*  
 1925 Geddes, James R., *Lt. Col.*  
 1926 Drum, John, *Lt. Col.*  
 1928 White, James M., *Col.*  
 1929 Walker, Warren W., *Capt.*  
 1930 Herbert, Maurice S., *Corp.*  
 1931 Hickey, Thomas J., *Maj.*  
 1932 Birdsell, Joseph B., *1st Lt.*  
 1933 Hayden, George W., Jr., *1st Sgt.*  
 1934 Benedict, Samuel L., Jr., *Corp.*  
 Child, Huntley, Jr., *Maj.*  
 Davenport, Lawrence A., *Pfc.*  
 Kepler, C. Jasper, *Capt.*  
 1935 Garrison, Ritchie, *Maj.*  
 1937 Karch, Richard G., *Lt.*  
 1938 Crichton, John A., *Lt. Col.*  
 Knight, Frank A., *Lt.*  
 1939 Davis, Richard G., *Capt.*  
 1940 Cosby, Joseph T., Jr., *Lt. Col.*  
 1941 Cooney, James S., *1st Lt.*  
 Cox, Raymond B., Jr., *T.5.*  
 1942 Bossi, Charles E., *Sgt.*  
 Clark, Victor F., *S.Sgt.*  
 Devoe, Donald B., *Maj.*  
 1943 Borden, Francis R., *T.4.*  
 Borden, Milton E., Jr., *Pfc.*  
 Gonzalez, Angel M., *S.Sgt.*  
 Handelman, Robert B., *Corp.*  
 Kates, Leonard W., *Lt.*  
 2-44 Arsem, A. Donald, *Pvt.*  
 Fisher, Paul H., *1st Lt.*  
 Knapke, Herbert F., *Pvt.*  
 10-44 Benedict, Robert E., *Corp.*  
 6-46 Blatt, Frank J., *Pvt.*  
 9-46 Calabi, Eugenio, *Corp.*  
 Beckington, Arthur R., *Lt.*  
 Draper, Earle S., Jr., *Capt.*  
 Goldmann, Kurt, *S.Sgt.*  
 Mendoza, Luis H., *Lt. Col.*  
 1947 Block, Kenneth L., *Lt.*  
 Bourne, Henry C., Jr., *1st Lt.*  
 Buford, Robert S., *S.Sgt.*  
 Buzzard, William S., *Corp.*  
 Cavanagh, Edwin A., *Maj.*  
 Cox, Lavonne E., *Lt. Col.*  
 Ellis, Harold B., *Maj.*  
 Hamm, Frederick F., *Capt.*  
 Harris, Leonard, *Lt.*  
 Himmelblau, David M., *Lt.*  
 Holroyd, Edmond W., Jr., *1st Lt.*  
 Hylas, Albert E., *Capt.*  
 Karmazin, John, Jr., *T.4.*  
 King, Norman B., *1st Lt.*  
 King, Ralph D., *Col.*  
 Kistner, Edward C., Jr., *Pfc.*  
 Sanders, Vernon K., *Capt.*  
 Starnes, William L., Jr., *Maj.*  
 Woodbury, Harry G., Jr., *Col.*

## U.S.N.

1905 Cooper, Edgar B., *C.B.M.*  
 1911 Burdett, Paul, *C.B.M.*  
 1926 Clark, Lewis F., *Lt. Comdr.*  
 1929 Ford, Harold E., *Comdr.*  
 1982 Beam, James A., *C.M.Ic.*  
 Dryer, Rufus K., *2d, Cadet*  
 Lawson, Robert W., *Lt. (j.g.)*  
 Burton, Robert W., *Lt. Comdr.*  
 Dobson, Robert A., *Lt.*  
 Moreland, Oliver J., *Lt. (j.g.)*  
 1935 Davis, Paul E., Jr., *Lt.*  
 1936 Hitchcock, Richard B., *Ens.*  
 1938 Cetthe, Michael S., *Lt. (j.g.)*  
 Dillon, James J., *Lt. Comdr.*  
 Ford, John J., *Lt.*  
 1940 Fanning, Oliver M., *Lt.*  
 1941 Furtek, Alfred, *Ens.*  
 Hering, Karl W., *R.T.M.2c.*  
 Mar, James W., *E.T.M.3c.*  
 1942 Ogle, George M., *Ens.*  
 Wynne, Richard C., *Ens.*  
 Berude, John B., *Lt. (j.g.)*  
 Birsmore, Earl L., *S.1c.*  
 Hildreth, William W., Jr., *Lt.*  
 Hillhouse, Andrew F., *Ens.*

2-44 Elias, Peter, *E.T.M.1c.*  
 Gamundi, Reynold F., *Rd.M.2c.*  
 Joseph, Kenneth W., *Lt.*  
 Morrison, Samuel G., *Lt. (j.g.)*

10-44 Carlson, Ray G., *Ens.*  
 Cowan, Wesley D., *A.S.*  
 Ing, Sheridan C. F., *E.T.M.*  
 2-46 Kirshen, Howard R., *Lt.*  
 Marks, Robert H., *Ens.*  
 6-46 Belcher, E. Loring, *A.S.*  
 9-46 Bacon, Theodore S., Jr., *Lt.*  
 Buttolph, James D., *S.1c.*  
 Curran, John J., *S.2c.*  
 Hershey, Richard L., *Ens.*  
 Morehead, Dean L., *Ens.*  
 Atkins, Victor K., *Lt.*  
 Bailey, Irving C., *Q.M.S.C.*  
 Duncan, George C., *Lt. Comdr.*  
 Ireland, John D., *Capt.*  
 McNitt, Robert W., *Comdr.*  
 Seedlock, Walter F., *Lt. Comdr.*

DECORATIONS  
(In addition to those previously reported in The Review)

## U.S.A.

1911 Hall, Edward R., *Lt. Col.*, Officer, Order of Leopold II (Belgium).  
 1912 Montgomery, Edward, *Brig. Gen.*, Distinguished Service Medal.

1915 Gillespie, Alexander G., *Brig. Gen.*, Distinguished Service Medal; Legion of Merit.

1917 Groves, Leslie R., Jr., *Maj. Gen.*, Legion of Merit; Honorary Companion of the Most Honorable Order of the Bath (Great Britain); Order of the Crown in the degree of Commander (Belgium); Presidential Medal of Merit (Nicaragua).

Kennedy, Grafton S., *Col.*, Legion of Merit; Bronze Star; Croix de Guerre with Palms (Belgium).

Kingman, Allen F., *Brig. Gen.*, Legion of Merit; Bronze Star; Honorary Commander, Order of the British Empire; Officer, Legion of Honor (France); Croix de Guerre with Palm (France); Commander, Order of Leopold II (Belgium); Grand Officer, Ouissam Alaaoute Cherifien (Morocco); Grand Officer, Nichan Iftikhar (Tunisia).

Mackler, Max J., *Col.*, Croix de Guerre with Silver Star (France).

Medding, Walter L., *Col.*, Legion of Merit; Officer, Order of the British Empire; Commander, Order of the Crown (Italy). Roberts, Claudius H. M., *Col.*, Legion of Merit (2); Order of the British Empire.

1918 Collins, Harold E., *Lt. Col.*, Order of the British Empire. Kayser, Wendell H., *Col.*; Legion of Merit.

1920 Bradshaw, Aaron, Jr., *Brig. Gen.*, Distinguished Service Medal; Silver Star; Bronze Star; Honorary Commander, Order of the British Empire; Legion of Honor, Grade of Officer, and the Croix de Guerre with Palm (France); Silver Medal for Valor (Italy); Commander, Order of the Crown (Italy); Patriot's Medal (Italy); Commander, Order of Saints Mauritius and Lazarus (Italy); Papal Lateran Cross (Italy); Cross of Merit, First Class, Sovereign Military Order of Malta.

Colton, Roger B., *Maj. Gen.*, Distinguished Service Medal. Gilliland, Leland W., *Col.*, Bronze Star.

Owen, Frank S., *Lt. Col.*, Air Medal; Bronze Star; Purple Heart.

Van Volkenburgh, Robert H., *Brig. Gen.*, Distinguished Service Medal.

Warner, Walter W., *Col.*, Distinguished Service Medal; Legion of Merit.

Cohen, Asher Z., *Col.*, Legion of Merit.

Gould, Sydney W., *Col.*, Legion of Merit.

Hume, Edgar E., *Brig. Gen.*, Distinguished Service Medal (2); Legion of Merit; Silver Star; Soldiers Medal; Purple Heart (2); Bronze Star (2).

Moss, Lewis W., *Lt. Col.*, Purple Heart.

Rhodes, Lester F., *Col.*, Legion of Merit.

Heavey, William F., *Brig. Gen.*, Distinguished Service Medal; Legion of Merit; Purple Heart (2); Bronze Star.

Hogan, Randall J., *Col.*, Bronze Star.

Hoge, William M., *Maj. Gen.*, Distinguished Service Cross; Legion of Merit; Silver Star (2); Purple Heart; Bronze Star.

Irvine, Elroy S. J., *Col.*, Legion of Merit.

Johns, Dwight F., *Brig. Gen.*, Legion of Merit.

Laverly, Francis J., *Lt. Col.*, Croix de Guerre.

Thomas, Earl R., *Col.*, Order of the British Empire.

Walke, Roger S., *Lt. Col.*, Bronze Star.

Blackmore, Philip G., *Brig. Gen.*, Distinguished Service Medal; Legion of Merit; Bronze Star.

Hinds, John H., *Brig. Gen.*, Distinguished Service Medal; Silver Star; Purple Heart; Air Medal; Honorary Commander, Order of the British Empire.

Hauseman, David N., *Brig. Gen.*, Distinguished Service Medal; Legion of Merit.

Kelsey, Benjamin S., *Col.*, Legion of Merit; 2 Oak Leaf Clusters to Air Medal; Croix de Guerre with Palm.

Knight, Alfred C., *Lt. Col.*, Bronze Star (2).

O'Hearn, Joseph A., *Lt. Col.*, Legion of Merit.

Reiff, Stanley G., *Lt. Col.*, Legion of Merit.

White, James M., *Col.*, Legion of Merit; Bronze Star with Cluster; Purple Heart; Officer, Order of the British Empire.

McReynolds, George B., *Col.*, Legion of Merit (Oak Leaf Cluster); Bronze Star.

Meekins, Raymond M., *Col.*, Order of Cloud and Banner (China).

Slaughter, Willis R., *Col.*, Legion of Merit.

Clough, Lyle A., *Lt. Col.*, Legion of Merit.

Feagin, Lawrence B., *Col.*, Legion of Merit.

Henry, Stephen G., *Maj. Gen.*, Legion of Merit.

Ilfeld, Max L., *Maj.*, Bronze Star (2).

Sturdy, William W., *Lt. Col.*, Legion of Merit.

Baker, Hoyt S., *Capt.*, Purple Heart.

Gardiner, E. Willard, *Lt. Col.*, Legion of Merit.

Geddes, James R., *Lt. Col.*, Bronze Star.

Stansfield, Robert S., Jr., *Chap.*, Bronze Star.

Billings, Asa W. K., Jr., *Lt. Col.*, Bronze Star(3); Legion of Honor (France); Croix de Guerre with Palm.

Bittner, Guy C., *Col.*, Legion of Merit.

Carey, James F., *Lt. Col.*, Purple Heart.

Dean, Robert C., *Col.*, Officer, Order of Orange-Nassau (Netherlands); Croix de Guerre with Vermilion Star (France); Croix de Guerre with Palm (Belgium).

Deignan, John E., *Col.*, Bronze Star.

Hoar, William H., *Maj.*, Bronze Star.

Mattson, Robert E., *Col.*, Order of the British Empire.

Mearls, Walter J., *Col.*, Legion of Merit.

Rogers, Robert W., *Lt. Col.*, Legion of Merit.

Anderson, Andrew, Jr., *Capt.*, Legion of Merit.

Burton, Albert H., *Col.*, Distinguished Service Medal.

De Luccia, E. Robert, *Lt. Col.*, Legion of Merit.

Frederick, William R., Jr., *Lt. Col.*, Bronze Star.

Glantzberg, Frederic E., *Col.*, Distinguished Flying Cross(2); Legion of Merit; Silver Star; Air Medal(5); Boyaca Cross (Colombia).

Harrison, Edwin H., *Col.*, Military Cross (Czechoslovakia).

Horton, Donald F., *Col.*, Legion of Merit.

Vandervoort, Benjamin F., *Col.*, Legion of Merit.

Francis, Edwin A., *Maj.*, Bronze Star.

Gardner, Grandison, *Maj. Gen.*, Distinguished Service Medal; Legion of Merit; Honorary Commander, Order of the British Empire.

Hauseman, David N., *Brig. Gen.*, Distinguished Service Medal; Legion of Merit.

Kelsey, Benjamin S., *Col.*, Legion of Merit; 2 Oak Leaf Clusters to Air Medal; Croix de Guerre with Palm.

Knight, Alfred C., *Lt. Col.*, Bronze Star (2).

O'Hearn, Joseph A., *Lt. Col.*, Legion of Merit.

Reiff, Stanley G., *Lt. Col.*, Legion of Merit.

White, James M., *Col.*, Legion of Merit; Bronze Star with Cluster; Purple Heart; Officer, Order of the British Empire; Legion of Honor (France); Croix de Guerre with Palm (Belgium).

McReynolds, George B., *Col.*, Legion of Merit (Oak Leaf Cluster); Bronze Star.

Meekins, Raymond M., *Col.*, Order of Cloud and Banner (China).

Slaughter, Willis R., *Col.*, Legion of Merit.

Clough, Lyle A., *Lt. Col.*, Legion of Merit.

Feagin, Lawrence B., *Col.*, Legion of Merit.

Henry, Stephen G., *Maj. Gen.*, Legion of Merit.

Ilfeld, Max L., *Maj.*, Bronze Star (2).

Sturdy, William W., *Lt. Col.*, Legion of Merit.

Baker, Hoyt S., *Capt.*, Purple Heart.

Gardiner, E. Willard, *Lt. Col.*, Legion of Merit.

Geddes, James R., *Lt. Col.*, Bronze Star.

Eaton, Wilfred P., *Lt. Col.*, Bronze Star.

	Foster, Robert J., <i>Lt. Col.</i> , Croix de Guerre with Star.	Herb, Edward G., <i>Col.</i> , Legion of Merit; Bronze Star; Croix de Guerre.	Gunderson, Clarence H., <i>Col.</i> , Bronze Star.	Sanders, Vernon K., <i>Capt.</i> , Bronze Star.
	Heifetz, Arthur, <i>Lt. Col.</i> , Bronze Star.	Lawrence, James, Jr., <i>Maj.</i> , Bronze Star.	Hartshorne, Pierre F., <i>Capt.</i> , Purple Heart.	Starnes, William L., Jr., <i>Maj.</i> , Bronze Star; Purple Heart.
	Hill, Edwin V., <i>Lt. Col.</i> , Legion of Merit.	McCulla, William L., <i>Col.</i> , Legion of Merit; Bronze Star.	MacLeod, John H. Jr., <i>Maj.</i> , Bronze Star.	Stevenson, Robin, <i>Lt.</i> , Air Medal; Purple Heart.
1931	Buckingham, Burdette H., <i>Lt. Col.</i> , Bronze Star.	Berg, Quentin, <i>Lt. Col.</i> , Bronze Star.	Rapkin, Maurice, <i>Maj.</i> , Bronze Star; Purple Heart.	Woodbury, Harry G., Jr., <i>Col.</i> , Legion of Merit; Silver Star.
	Finberg, Irving W., <i>Col.</i> , Legion of Merit; Order of the British Empire; Medal of Valor (Italy).	Brauer, Robert J., <i>Maj.</i> , Bronze Star.	Storn, Frank J., Jr., <i>Maj.</i> , Distinguished Flying Cross; Air Medal(2).	<b>U.S.N.</b>
	Mohr, Lawrence G., <i>Col.</i> , Bronze Star.	Garber, Alvin J., <i>1st Lt.</i> , Distinguished Flying Cross; 4 Oak Leaf Clusters to Air Medal.	Sullivan, Richard D., <i>Capt.</i> , Distinguished Flying Cross(2); Air Medal(5).	1905 Furer, Julius A., <i>Rear Adm.</i> , Navy Cross.
	Niles, Wallace E., <i>Col.</i> , Legion of Merit; Bronze Star.	Hazeltine, Allen V., <i>Lt. Col.</i> , Legion of Merit.	Walkowicz, Teddy F., <i>Maj.</i> , Legion of Merit.	1907 Ryden, Roy W., <i>Rear Adm.</i> , Legion of Merit.
	Ritchie, Frederick A., <i>Lt. Col.</i> , Legion of Merit.	Kiersted, Fred D., <i>Maj.</i> , Bronze Star.	DeLeo, Felix R., <i>Maj.</i> , Purple Heart.	Van Keuren, Alexander H., <i>Rear Adm.</i> , Legion of Merit.
	Robbins, Charles, <i>Lt. Col.</i> , Bronze Star.	Moore, Leo B., <i>Lt. Col.</i> , Bronze Star.	Dengler, Alfred T., <i>Capt.</i> , Bronze Star(2); Croix de Guerre (France).	1909 Howard, Herbert S., <i>Rear Adm.</i> , Legion of Merit; Honorary Commander of the British Empire.
1932	Baschnagel, Robert W., <i>Maj.</i> , Bronze Star.	Osborne, N. Montgomery, Jr., <i>Col.</i> , Legion of Merit.	Gannon, Richard X., <i>Capt.</i> , Silver Star; Bronze Star.	1915 Slater, Nelson, <i>Comdr.</i> , Bronze Star.
	Brown, John J., <i>Lt. Col.</i> , Bronze Star.	Pellmounter, Thomas V., <i>Maj.</i> , Bronze Star.	Hahn, William, <i>Lt.</i> , Distinguished Flying Cross (Oak Leaf Cluster); Air Medal(2) Oak Leaf Clusters; Bronze Star(3).	1916 Saunders, Harold E., <i>Capt.</i> , Legion of Merit; Distinguished Service Medal.
	Crawford, David J., <i>Col.</i> , Legion of Merit.	Rosen, Leo, <i>Lt. Col.</i> , Legion of Merit.	Hinchman, John, <i>Capt.</i> , Bronze Star.	1917 Paine, George T., <i>Commo.</i> , Legion of Merit; Order of the British Empire.
	Emert, Frederick J., <i>Lt. Col.</i> , Bronze Star; Breast Order of Cloud and Banner (China).	Smedile, Joseph A., <i>Col.</i> , Bronze Star.	Hughes, Richard R., <i>Maj.</i> , Purple Heart.	Sullivan, William A., <i>Commo.</i> , Legion of Honor, degree of Officer (France); Grand Officer, Crown of Italy.
	Heath, Louis T., <i>Col.</i> , Legion of Merit; Bronze Star.	Webster, Howard E., <i>Lt. Col.</i> , Bronze Star (2 Oak Leaf Clusters).	Jess, Edward O., <i>Maj.</i> , Air Medal.	1919 Hall, Roger T., <i>Comdr.</i> , Bronze Star.
	Metcalfe, Arthur G. B., <i>Lt. Col.</i> , Silver Star.	Wemple, George B., <i>Lt. Col.</i> , Bronze Star.	Larkin, Mayo I., <i>Lt.</i> , Distinguished Flying Cross; Air Medal; Purple Heart.	1920 Cochrane, Edward L., <i>Vice Adm.</i> , Distinguished Service Medal; Honorary Knight Commander, Order of the British Empire.
	Morgan, Richard L., <i>Lt. Col.</i> , Croix de Guerre (France).	Black, Paul B., <i>Capt.</i> , Bronze Star.	Levene, Martin B., <i>Maj.</i> , Bronze Star(2).	Kell, Claude O., <i>Rear Adm.</i> , Legion of Merit(2).
	Carbonell, Joseph E., Jr., <i>Capt.</i> , Bronze Star.	Crichton, John A., <i>Lt. Col.</i> , Air Medal; Bronze Star.	Lewkowicz, Thaddeus B., <i>Capt.</i> , Distinguished Flying Cross; Air Medal(5).	Pennoyer, Frederick W., Jr., <i>Rear Adm.</i> , Air Medal; Gold Star in lieu of second Legion of Merit.
1933	Fletcher, Leslie S., <i>Col.</i> , Bronze Star(2).	Fields, Kenneth E., <i>Col.</i> , Silver Star; Bronze Star.	Marsilius, Newman M., Jr., <i>Lt. Col.</i> , Bronze Star.	1921 McKee, Andrew L., <i>Commo.</i> , Legion of Merit; Bronze Star.
	Harvey, Gardner, <i>Pvt.</i> , Purple Heart.	Fisher, Hillary J., <i>M.Sgt.</i> , Bronze Star.	Sommer, Paul W., <i>Capt.</i> , Air Medal.	Rawlings, Norborne L., <i>Rear Adm.</i> , Legion of Merit; Gold Star in lieu of second Legion of Merit.
	Herlich, Benjamin, <i>Maj.</i> , Bronze Star.	Gillon, Paul N., <i>Col.</i> , Legion of Merit; Bronze Star.	Torrey, Bradford M., <i>Capt.</i> , Bronze Star.	Wade, William C., <i>Capt.</i> , Legion of Merit.
	Julian, Leonard J., <i>Lt. Col.</i> , Bronze Star.	Ginsburg, Everett H., <i>Capt.</i> , Air Medal.	Dunn, Raymond A., <i>Capt.</i> , Croix de Guerre with Silver Star (France).	Wallin, Homer N., <i>Capt.</i> , Distinguished Service Medal.
	Kiddie, Gustave E., <i>Col.</i> , Legion of Merit; Bronze Star; Military Cross (Czechoslovakia).	Grosselfinger, Frederick B., <i>Lt. Col.</i> , Bronze Star; Knight Officer Cross of the Order of the Crown (Italy).	Horst, Bruce E., <i>Lt.</i> , Air Medal.	1922 Beatty, Frank E., <i>Rear Adm.</i> , Legion of Merit(2); Bronze Star.
	Mihno, John W., <i>Capt.</i> , Bronze Star(2).	Henderson, Richard, <i>Maj.</i> , Bronze Star.	Recksett, Bernard S., <i>Capt.</i> , Bronze Star.	Carlson, Milton O., <i>Commo.</i> , Legion of Merit; Bronze Star.
	Neil, Donald R., <i>Col.</i> , Legion of Merit; Honorary Officer, Order of the British Empire; Croix de Guerre with Palm.	Iwatsu, Peter O., <i>Capt.</i> , Bronze Star.	Clew, Harry F., Jr., <i>Lt.</i> , Air Medal; Purple Heart.	Kitts, Willard A., <i>3d. Adm.</i> , Honorary Commander, Order of the British Empire.
	Newton, Carroll T., <i>Col.</i> , Cross of Valor (Italy).	Maguire, James, <i>Lt. Col.</i> , Bronze Star.	Coleman, Samuel D., <i>1st Lt.</i> , Distinguished Flying Cross; Air Medal(4).	1923 Bolster, Calvin M., <i>Capt.</i> , Legion of Merit.
	Raasen, John C., <i>Col.</i> , Distinguished Service Medal; Legion of Merit.	Cella, Richard T., <i>Lt. Col.</i> , Distinguished Flying Cross; Legion of Merit; Air Medal(3).	Goldberg, Abraham J., <i>Lt.</i> , Purple Heart.	Haugen, Lawrence T., <i>Capt.</i> , Bronze Star.
	Spilhaus, Athelstan F., <i>Lt. Col.</i> , Legion of Merit.	Davis, Richard G., <i>Capt.</i> , Bronze Star.	Heckel, Alfred H., Jr., <i>Lt.</i> , Purple Heart; Bronze Star.	Ludlow, George H., <i>Comdr.</i> , Navy Cross; Purple Heart; Silver Medal of Military Valor (Italy).
1934	Farnum, Sayward H., <i>Lt. Col.</i> , Bronze Star(2).	Dorsey, Herbert G., Jr., <i>Capt.</i> , Air Medal.	Kennelly, William J., Jr., <i>Lt.</i> , Air Medal(2).	Nibecker, Paul B., <i>Rear Adm.</i> , Legion of Merit.
	Greep, Rudolph T., <i>Lt. Col.</i> , Legion of Merit.	Elkind, Henry B., Jr., <i>Maj.</i> , Purple Heart; Bronze Star.	Noyes, Trigg, <i>Pfc.</i> , Purple Heart (2).	Redgrave, DeWitt C., <i>Capt.</i> , Legion of Merit.
	Head, John M. D., <i>Lt. Col.</i> , Bronze Star; Order of the British Empire.	Gaines, Richard V., <i>W.O. (j.g.)</i> , Legion of Merit.	Ross, Leroy E., Jr., <i>Sgt.</i> , Purple Heart.	Sexton, Horatio C., <i>Capt.</i> , Legion of Merit; Order of the British Empire.
	Jewett, Raymond B., <i>Lt. Col.</i> , Legion of Merit; Bronze Star.	Howland, James C., <i>Maj.</i> , Legion of Merit; Bronze Star.	Skeljeski, I. Stanley, <i>Lt.</i> , Air Medal (3 Oak Leaf Clusters).	Wheelock, Charles D., <i>Rear Adm.</i> , Legion of Merit.
	McCrimmon, Kenneth A., <i>Col.</i> , Bronze Star; Croix de Guerre with Palm (Belgium).	Jeffus, Charles J., <i>Col.</i> , Legion of Merit.	Walker, Edward B., <i>3d. Corp.</i> , Bronze Star(2).	1924 Fisher, Alvan, <i>Capt.</i> , Bronze Star.
	Milburn, John D., <i>Lt.</i> , Air Medal (2).	Kerkering, John H., <i>Col.</i> , Legion of Merit; Bronze Star.	10-44 Clayton, Walter A., <i>Capt.</i> , Silver Star; Purple Heart(3); Bronze Star; Croix de Guerre.	1925 Chapline, George F., <i>Capt.</i> , Bronze Star.
	Mitchell, Daniel C., <i>Lt. Col.</i> , Bronze Star.	Cecil, Chester W., <i>Col.</i> , Bronze Star.	Erikson, Carl G., Jr., <i>Sgt.</i> , Purple Heart; Bronze Star.	1927 Johnson, Ralph B., <i>Comdr.</i> , Legion of Merit.
	Wetherill, Proctor, <i>Maj.</i> , Bronze Star.	Chamberlain, Carlton A., <i>Lt. Col.</i> , Distinguished Service Medal(2); Soldiers Medal; Purple Heart; Air Medal(7).	MacLean, Alan L., <i>Lt.</i> , Soldiers Medal.	1928 Danis, Anthony L., <i>Capt.</i> , Legion of Merit; Purple Heart; Bronze Star.
1935	Edgar, Edward C., <i>Lt. Col.</i> , Legion of Merit.	Dewey, Bradley, Jr., <i>Capt.</i> , Purple Heart.	Reinhardt, William A., <i>1st Lt.</i> , Air Medal.	Nelson, Frederick J., <i>Capt.</i> , Legion of Merit.
	Fong, Louis B. C., <i>Maj.</i> , Bronze Star.	Forney, Gerard J., <i>Col.</i> , Legion of Merit; Air Medal; Bronze Star.	6-45 Day, Joseph P., <i>3d. S.Sgt.</i> , Bronze Star; Cloud Banner, 7th Class (China).	Rudolph, Robert P., <i>Lt. Comdr.</i> , Bronze Star.
	Gales, George F., <i>Lt. Col.</i> , Bronze Star.	Graham, Jackson, <i>Col.</i> , Legion of Merit.	Dick, Philip A., <i>S.Sgt.</i> , Bronze Star.	1929 Bushnell, Carl H., <i>Capt.</i> , Legion of Merit.
	Garrison, Ritchie, <i>Maj.</i> , Bronze Star.	Hodgson, Roger B., <i>Capt.</i> , Bronze Star.	Keepnews, Lawrence W., <i>Lt.</i> , Silver Star; Bronze Star.	Hibbard, Donald L., <i>Capt.</i> , Legion of Merit.
	Garton, George G., <i>Lt. Col.</i> , Legion of Merit; Silver Star; Purple Heart; Air Medal; Bronze Star; Croix de Guerre with Palm (France).	Mathews, Elmo S., <i>Col.</i> , Legion of Merit; Bronze Star.	1930 Seitz, George A., <i>Commo.</i> , Legion of Merit(2); Bronze Star.	
	Kumpe, George, <i>Col.</i> , Bronze Star(2); Croix de Guerre (France).	Maxwell, Alfred R., <i>Brig. Gen.</i> , Distinguished Service Medal; Legion of Merit; Honorary Commander, Order of the British Empire; Legion of Honor, degree of Chevalier (France); Croix de Guerre with Palm (France).	Buracker, William H., <i>Rear Adm.</i> , Legion of Merit; Silver Star; Purple Heart.	
	Lane, Stanley M., <i>Maj.</i> , Bronze Star; Croix de Guerre (Belgium).	Orpen, J. Harry, <i>Lt. Col.</i> , Distinguished Flying Cross; Air Medal.	King, Norman B., <i>1st Lt.</i> , Air Medal (2 Oak Leaf Clusters).	1931 Bennett, Claude H., Jr., <i>Capt.</i> , Legion of Merit.
	Needham, Roger E., <i>Lt. Col.</i> , Legion of Merit; Croix de Guerre.	Russell, Sam C., <i>Col.</i> , Bronze Star; Croix de Guerre with Palm (France).	King, Ralph D., <i>Col.</i> , Legion of Merit; Bronze Star; Croix de Guerre.	Ekstrom, Clarence E., <i>Capt.</i> , Legion of Merit(2); Bronze Star.
	Robinson, Walter G., <i>T. Sgt.</i> , Bronze Star.	Sherman, Nathan, <i>Capt.</i> , Bronze Star.	Kistner, Edward C., Jr., <i>Pfc.</i> , Bronze Star.	Janney, Samuel A., <i>Comdr.</i> , Bronze Star(2).
	Trichel, Gervais W., <i>Col.</i> , Legion of Merit.	Stewart, Robert W., <i>Lt. Col.</i> , Bronze Star.	Moore, Clinton C., Jr., <i>S. Sgt.</i> , Air Medal(3); Purple Heart.	1932 Pfingstag, Herbert J., <i>Capt.</i> , Bronze Star.
	Waferling, John J., <i>Maj.</i> , Bronze Star; Purple Heart.	Vanderpoel, John A., <i>Maj.</i> , Distinguished Flying Cross; Air Medal(4).	Robson, Horace T., <i>Corp.</i> , Bronze Star.	Tate, Robert, <i>Comdr.</i> , Bronze Star.
1936	Bagnulo, Aldo H., <i>Col.</i> , Legion of Merit.	Brown, Roy W., Jr., <i>Lt.</i> , Distinguished Flying Cross; Air Medal(7).	Gillispie, Charles C., <i>Capt.</i> , Legion of Merit; Bronze Star.	
	Borden, Herbert M., <i>Capt.</i> , Bronze Star.	Cheek, James H., Jr., <i>Maj.</i> , Bronze Star.		
	Boulware, Ford M., <i>Lt. Col.</i> , Croix de Guerre.	Folberth, William M., Jr., <i>Maj.</i> , Air Medal.		
	Carter, Frederick H., <i>Lt. Col.</i> , Legion of Merit.	Gillispie, Charles C., <i>Capt.</i> , Legion of Merit; Bronze Star.		
	Carter, Marshall S., <i>Brig. Gen.</i> , Distinguished Service Medal (2); Legion of Merit; Bronze Star; Cloud and Banner(2) (China).			

## ALUMNI AND OFFICERS IN THE NEWS

## Honors

» For President Compton, the Public Welfare Medal of the Marcellus Hartley Fund for 1947.

» For Willis R. Whitney '90, the new Willis R. Whitney Award in the Science of Corrosion, given by the National Association of Corrosion Engineers.

» For Henry S. Baldwin '96, a metallic plaque from the City of Hartford in recognition of his contributions to the automotive industry.

» For Lester D. Gardner '98, the 1947 Daniel Guggenheim Medal for notable achievements in the advancement of aeronautics.

» For Albert O. Wilson '11, knighthood in the Swedish Order of Vasa.

» For Frederick O. A. Almquist '23, the Dexter Brackett Memorial Medal for a paper judged the best published in the journal of the New England Water Works Association during 1946.

» For Graydon L. Abbott '34 and Alden E. Tower '35, Navy medals and plaques for their war service as naval architects.

## Honorary Degrees

» For Samuel C. Prescott '94, the doctorate of science from Lehigh University.

» For Arthur C. Willard '04, the doctorate of laws from the University of Maine.

» For George C. Kenney '11, General, U.S.A., the doctorate of laws from the University of Notre Dame.

» For Edward B. Peck '14, the doctorate of science from Clark University.

» For Robert E. Wilson '16, the doctorate of laws from Northwestern University.

» For Carroll L. Wilson '32, the doctorate of science from Williams College.

## DEATHS

\* Mentioned in class notes

EDWARD P. ALLIS '71, March 9.

JOHN B. HENCK '76, September 13, 1945.

JAMES ATHERTON '77, August 3.\*

GEORGE W. KITTREDGE '77, August 22.\*

WILLIAM H. EDDY '85, March 11.\*

WILLIAM D. FULLER '85, June 19.\*

MORRIS L. GREELEY '85, November, 1945.\*

RICHARD A. LEIGH '86, April 6.

ARTHUR G. ROBBINS '86, October 26.  
HARRIET RANSOM MILINOWSKI '86, March 31, 1946.  
FRANK F. TRIPP '87, in 1946.  
SAM WHEELER '88, April 13.\*  
KINSLEY DUNBAR '89, August 18.  
ADOLPH HALLENBERG '90, February 13.\*  
HENRY B. PENNELL '90, June 18.\*  
HENRY G. BRADLEE '91, September 3.\*  
RALPH D. COLBURN '91, March 12.\*  
ETHEL BLACKWELL ROBINSON '91, July 31.\*  
MORRILL S. RYDER '91, June 17.\*  
HARTLEY L. WHITE '91, September 20.  
MARY LOVERING HOLMAN '92, August 17.\*  
HERBERT R. MOODY '92, October 20.  
DANA M. PRATT '92, August 19.  
EMMA KRAMER GREENLAW '94, May 2.\*  
ALBERT F. HUNT, JR., '94, April 18.\*  
ARTHUR LA MOTTE '94, July 17.\*  
LUTHER R. NASH '94, August 10.\*  
J. EARLSTON THROPP, JR., '94, June 26.\*  
CHARLES T. BROWNELL '95, April 6.\*  
HERBERT E. DAVIS '95, May 22.\*  
E. ARTHUR BALDWIN '96, September 27.\*  
ALLAN CAMERON, JR., '96, June 11, 1946.\*  
WILLIAM B. CORSON '96, July 8, 1944.\*  
FRANCIS C. HERSEY '96, September 9.\*  
MARION LEWIS LEE '96, July 18.\*  
ARMIN F. LINDENLAUB '96, January 9, 1944.\*  
ANNIE G. MOLLOY '96, October 7, 1945.\*  
FREDERIC N. LE BARON '97, September 22.  
FREDERIC L. BISHOP '98, October 11.  
WILLIAM E. PUTNAM '98, August 4.  
FREDERICK R. SITES '99, April 29.\*  
JAMES H. WALTON '99, June 6.\*  
RICHARD C. DEWOLF '00, March 8.\*  
EDWIN W. HAMMOND '00, January 29.\*  
CYRUS H. HAPGOOD '00, July 12.\*  
HENRY V. HUBBARD '00, October 6.  
LEWIS M. LAWRENCE '00, September 7, 1945.\*  
HARRY E. OSGOOD '00, April 3.  
BRACKLEY A. SHAW '00, December 22.\*  
EMIL F. VOGEL '00, April 8.\*  
JOHN P. BRIGGS '01, July 12.  
LOUIS E. WILLIAMS '01, August 21.  
ARCHIBALD GARDNER '02, January 24.\*  
JOHN A. HUTCHINSON '02, September 14.  
LEROY E. KERN '02, March 12.\*  
HERBERT M. BACON '03, March 19.\*  
HOWARD BREED '03, June 29.\*  
HOWARD S. DENHAM '03, June 30.\*  
ERNEST W. CALKINS, JR., '04, March 30.\*  
WILLARD D. CHANDLER '04, February 27, 1946.\*  
VICTOR H. ELSAS '04, April 17.\*  
JOSEPH B. FINNEGAN '04, July 4.  
GRANT FORD '04, April 29.\*  
DON L. GALUSHA '04, October 7.  
WILLIAM McENTEE '04, Captain, U.S.N., retired, September 7, 1946.\*  
GEORGE C. RICHARDS '04, May 2.\*  
PAUL A. BLAIR '05, December 22.\*  
ROYALL D. BRADBURY '05, March 21.\*  
WILLIAM D. B. MOTTER, JR., '05, March 18.\*

JOHN P. DAVIS '06, July 17.\*  
WILLIAM J. KNAPP '06, July 19.\*  
EVERETT C. STANTON '06, April 9, 1946.  
FRANK H. MUCHMORE '07, November, 1945.\*  
RALPH W. RENTON '07, September 1, 1946.  
CLAUDE V. TURNER '07, August 23, 1945.\*  
ARTHUR H. HASTINGS '08, July, 1944.\*  
ROBERT ROBERTSON '08, April 16.\*  
EDWIN C. BALL '08, May 29.\*  
WILLIAM P. BLODGET '09, October 25, 1946.  
HAROLD M. GLAZIER '09, July 31.\*  
WILLIAM H. JONES '09, October 17.  
HUGH J. LOFTING '09, September 26.  
CLARK S. ROBINSON '09, May 23.\*  
GUY W. BOLTE '10, September 21.  
HARRISON W. FLICKINGER '10, October 5.  
ROBERT H. LOMBARD '10, October 11.  
ALFRED I. PHILLIPS '10, October 6.  
CHARLES J. TONER '10, July 6, 1946.  
MAURICE R. THOMPSON '11, June 2.\*  
HERBERT S. CUMMINGS '12, January 10.  
STUART J. SCHOFIELD '12, August 4.  
GEORGE A. CURTIN '13, October 4.  
FRANK H. MAHONEY '13, July 19.  
ROBERT A. McMENIMEN '14, July 30.\*  
CHARLES SHAW '14, Commander, U.S.N., retired, January 30.\*  
JAMES E. MULLANEY '15, August 8.\*  
DONALD W. PERIN '15, June 19.\*  
CHARLES W. WHITALL '15, June 14, 1946.\*  
FRANK O. MILLER '17, August 5.  
GEORGE A. ELZ '18, August 19.\*  
FRANCIS J. MCGILL '20, July 14.\*  
JOHN G. MCLEOD, JR., '20, August 6, 1946.\*  
RAYMOND R. RIDGWAY '20, June 12.\*  
MAX SHLAGER '20, October 10.  
PHILIP B. SOMERBY '20, September 3.  
CHRISTOPHER B. NELSON '21, July 5.\*  
ROGER B. McMULLEN, JR., '22, August 15.  
GEORGE W. POTTER '22, June 16.\*  
DONALD E. WALCH '22, September 6.\*  
PHILOMENA R. CAPUTO '23, August 2.  
THOMAS W. CONRAD '23, Captain, U.S.A., February 14.  
BRUCE M. MOSSMAN '23, August 7.  
SAMUEL B. BREWER '24, Captain, U.S.N., December 10, 1946.  
DONALD W. MURDOCK '24, September 2.  
RAOUL R. GAMACHE '25, June 20.  
GUSTAVE A. MARSH '25, August 11.  
HARRY R. GAMBLE '26, August 16.\*  
C. FRANCIS JENKINS, JR., '26, June 18.\*  
JAMES H. BURNAP '31, July 11, 1946.  
HILDA M. LYON '32, December 2, 1946.  
ALBINY MACHINSAL '32, July 9, 1946.  
SHUICHI KUSAKA '38, August 31.  
WARREN B. GODDARD '39, August 24.  
CULLIE B. HARRIS '41, Major, U.S.A., August 12.  
THEODORE J. BADGER '42, September 2, 1946.  
ALBERT A. SCHAEFER, staff, October 23.  
WILLIAM E. WICKENDEN, former staff, August 31.

## NEWS FROM THE CLUBS AND CLASSES

## CLUB NOTES

## M.I.T. Club of the Kanawha Valley

Our first ladies' night was held on July 12 at the Wren's Nest, St. Albans, W. Va. Eighteen Alumni and 19 guests enjoyed one of Mrs. Wren's delicious chicken dinners.

After the meal, at a brief business meeting conducted by the President, Francis George Davidson '22, the officers for the coming season were elected. Our Vice-president, Melville E. Hitchcock '37, was elevated to the rank of president, and Joseph C. Jeffords, Jr., '40 was elected as the new vice-president.

The highlight of the meeting was the address of the principal guest, Rev. Joseph Clare Hoffman, the popular pastor of Christ Methodist Church, Charleston, W. Va., who spoke on the subject of "Words." The three particular words discussed for the audience were "peace," "education," and "religion." Dr. Hoffman pointed out that the problem of obtaining world peace is a problem for the individual as well as for political leaders, that education for citizenship is needed more than any other course, and that the surest way of combating communism is to make our way of life superior and desirable to all. He concluded by reminding the group that there is nothing in this world worth saving except human values.

Alumni in attendance were the following: Arthur M. Rosenblatt '09, Thomas W. Bartram '21, Francis G. Davidson '22, Holden M. Dougherty '22, Ray M. Durrett '29, Charles H. Gilmour '31, Richard Gorman, Jr., '33, Edward F. Hillenbrand, Jr., '33, Paul J. Johnson '33, Almon S. Parker '33, Waverly Q. Smith '34, Joseph C. Jeffords, Jr., '40, Malcolm MacG. Anderson '42, Daniel G. Hulett '42, Robert W. King '42, Arthur J. Power '42, Howard P. McJunkin '43, and Geoffrey Robillard '44. — DANIEL G. HULETT '42, *Secretary*, 1595½ Quarrier Street, Charleston 1, W. Va.

## M.I.T. Club of Chicago

The annual meeting with election of officers was held on June 19 at the University Club of Chicago. Our guest of honor was George R. Harrison, Dean of Science, M.I.T., accompanied by our good friend, H. E. Lobdell '17, Executive Vice-president of the Alumni Association. The enthusiastic enjoyment evinced at this meeting and its large attendance made it one of the most successful we have ever held. Grateful thanks are due our dinner chairman, Bob Clyne '30. President Steinwedell '25 graciously served as toastmaster. Dean Harrison gave us of his best, as usual expressing his vast array of facts and figures with sparkling humor and wit.

Nominees for the coming year were submitted by the nominating committee,

consisting of Ed Farrand '21, chairman, John Barriger '21, L. H. G. Bouscaren '04, Elmer D. Szantay '35, and George E. Wallis '09. The nominees were unanimously elected, as follows: Pierre F. Lavedan '20, President; Herbert W. Kochs '25, Vice-president; Stanley M. Humphrey '28, Secretary; F. Richard Meyer, 3d, '42, Treasurer; Alfred A. Mulliken '32, Charles H. Toll, Jr., '23, and John W. Barriger '21, directors. A resolution of appreciation was signed by all the members for Bob van Kirk '18, our loyal Treasurer during these last two years. Bob has been going through a long period of illness, but with his staunch spirit we know he will make good.

We are now looking forward to another year of good fellowship and success, assured by this splendid group of men who have taken over our leadership. — STANLEY HUMPHREY '28, *Secretary*, Booz, Allen, and Hamilton, 135 South LaSalle Street, Chicago, Ill.

## M.I.T. Association of Cleveland

Preparations are being made for a very active season for our Club. R. H. Smith '23 continues as president, W. H. Robinson, Jr., '24 as executive vice-president, with L. D. Fyske '41 beginning a term as treasurer and G. R. Young '37 starting as the new secretary. The officers will exert a special effort toward an increase in active membership with the central theme being a larger and more energetic Cleveland Club. Our meetings have been held at the Lake Shore Country Club in Bratenahl and will undoubtedly continue there. We are particularly eager to have out-of-town guests and urge them to communicate with our Secretary whenever they are here.

Horace Ford was with us at our last meeting and presented his well-known topic, "The Financial Programs of M.I.T." He began the meeting with the very relaxing statement that he was with us not to collect funds but simply to give us information. Every Technology Club should make an effort to have Horace Ford as soon as possible. The background of Institute finances over the years and the current handling of its financial portfolio are as interesting as any subject we could recommend. Those who know Bill Robinson '24 will be sorry to learn that he has recently lost his wife. Mrs. Robinson was a splendid asset to this community and certainly complemented the broad abilities and activities of Bill. We extend our deep regrets and hope that our Club may in some way provide Bill with the needed relaxation or stimulation. — G. RICHARD YOUNG '37, *Secretary*, Weatherhead Company, 300 East 131st Street, Cleveland 8, Ohio.

## M.I.T. Club of Central Ohio

The annual dinner was held at the University Club on June 4. Thirty-five persons, including Alumni, their wives,

and guests, were present — a very good attendance, we thought, for our relatively small club.

After dinner, Harish Chandra Bijawat '45 explained the Indian independence movement. J. Ralph Shank, director of the engineering experiment station at Ohio State University, entertained us with a series of very interesting Kodachrome slides taken on a recent trip in the Canadian Rockies. Mr. Bijawat then kindly consented to take the floor again to answer questions and engage in a general discussion, prompted by his more formal talk. Mr. Bijawat's home is near Delhi, India. He holds a master's degree in chemical engineering from M.I.T. and is now studying for his Ph.D. at Ohio State University. He is a fluent speaker and proved most apt and informative in answering questions. The keen interest of our members in the discussion was evidenced by the fact that the gathering did not break up until almost midnight.

Our meetings were continued through the summer months on the regular schedule and showed increasing attendance. The group of six or eight who were regularly meeting at our luncheons a year ago has doubled in size. — CLARENCE E. RICHARDS '18, *Secretary*, American Education Press, Inc., 400 South Front Street, Columbus, Ohio.

## M.I.T. Club of South Florida

Thanks to our Al Taylor, the South Florida group held a splendid meeting on June 27. The 30 who attended (including guests) learned a great deal about modern commercial color photography. The Simms Edwards Studio of Miami, photographers for many northern advertising agencies, played host and provided a fine buffet supper, a very modern and spacious studio and laboratories, and skilled technical demonstrations. William S. Edwards, founder of the firm, gave an informal, comprehensive talk on "The Value of Photography in Advertising." For practical illustration, he summoned our President, Tom Coogan '24, to the front and seated him under 17,000 watts of spotlights. While Tom sweated, Mr. Edwards snapped four color shots of him. By the end of the evening, one of these pictures had been taken through 17 separate steps for developing and printing, and we all filed past to view a remarkable eight-by-ten color print, authentic in every fine detail. A group black-and-white photograph was also taken, and individual prints furnished for everyone present.

Mr. Edwards, a graduate of the Guggenheim School of Aeronautics at New York University, began by tracing the history of color film. Before World War II, Agfa had completed a great deal of research, and its parent company, I. G. Farben of Germany, was well to the front in this field. In recent years, Eastman Kodak has taken the lead, both with Kodachrome and the

new Ektachrome, used for our demonstration. Kodachrome has emulsions applied on either side of the base, but Ektachrome, a true "monopack," has all its emulsions on one side only of the film base, thereby giving greater clarity of detail. When queried as to why his own company is located in Miami, even though its largest customers are up north, Mr. Edwards stated that our South Florida skies and scenery are practically ideal for color work. For this reason, most of his shots are taken outdoors.

Because of the general group interest, Mr. Edwards then described the processes by which a full color print appears in a nationally circulated magazine, considering first the advertising agencies in competition for the account, then the planning of the advertisement, next the instructions received by the photographer from the agency the hiring of the models, and the shooting of the picture, and finally the dispatching of the completed print to the agency, the necessary engraving work, and submission of the entire layout to the magazine, in which space has been reserved many months before. The end result is a colorful spectacle, designed first to attract the consumer's eye and then lure the dollars from out his (and more often, her) pocket.

A short business meeting was held, with Tom Coogan '24 presiding. Clarence Thayer '23 was called upon to submit the secretary-treasurer's report. Announcement was then made that Fred Zurwelle '20 is now assistant secretary of the committee for screening prospective applicants for Technology. John Ostlund '35 was appointed placement chairman, to provide information for the assistance of Alumni wishing to settle in South Florida. Thayer then conveyed the results of a recent questionnaire submitted to all members. Of the early returns, a clear majority indicated that they were well pleased with our Club. The most popular forms of meeting were ladies' nights and picnics. It was agreed that we should soon go rural, and with the ladies.

The meeting proceeded to nominations of officers for the coming year. There was little debate, as everyone felt that the incumbent slate was excellent. To bear this out, we now have 64 members, an all-time high, and an adequate treasury. Without a dissenting vote, both Tom Coogan and Clarence Thayer were re-elected for the coming year. The question of downtown clubrooms was then raised. The past history of such quarters in Miami is not favorable, several university clubs having fallen apart during the past 10 years. A committee of one, Alexis Kononoff '29, was appointed to consult other engineering alumni groups in Miami on the chances of joint action in securing clubrooms.

Our closing minutes were devoted to a preview of the July meeting at Fred Zurwelle's home, featuring an outdoor barbecue. Willis Waldo '07, Vice-president and chief engineer of the Florida Ramie Company, was scheduled to tell us about that coming Florida product, *ramie*, a rope substitute with outstanding qualities that now place it in high demand. The following members attended: Charles W. Swift '99, Alfons G. Taylor (honorary), W. Barrington Miller '19, Henry G. Dooley '20,

Morris N. Lipp '20, Fred E. Zurwelle '20, Clarence P. Thayer '23, Cecil G. Young '23, Ruth H. Westbrook '24, Thomas P. Coogan '24, Harry R. Gamble '26, Alexis B. Kononoff '29, Charles W. MacMillan '33, George J. McCaughan '34, John J. Ostlund '35, Irving Peskoe '39, William Sussman '40, and Ralph P. Cromer '45. — CLARENCE P. THAYER '23, *Secretary*, 4212 Northwest Sixth Avenue, Miami, Fla. IRVING PESKOE '39, *Review Secretary*, 2852 Southwest 22d Terrace, Miami 33, Fla.

### M.I.T. Club of Milwaukee

The Club is really beginning to get its feet on the ground again, we are happy to report. The 1946-1947 season ended with one of the most enjoyable and successful get-togethers of the year, a picnic supper and beach party given at the Beach Club in Milwaukee on June 26. The total attendance of 54 members and wives was our best of the year.

Plans for the coming year were made at an executive committee meeting on September 12. The annual meeting will be held during October; new officers will then be elected and a set of by-laws placed before the Club for approval. Tentative plans call for five more meetings for the coming year. An up-to-date, pocket-sized directory of all members in this vicinity will be printed in the near future. — WILLIAM HAHN '42, *Secretary*, 750 North 14th Street, Milwaukee 3, Wis.

### M.I.T. Club of New York

We have completed the change in name of the Club from the Technology Club of New York to that given above, and as soon as it can be arranged, the new name will appear in the New York telephone directory — with our present address at 115 East 40th Street, under the auspices of the Architectural League.

The Spring Golf Tournament, or President's Cup, was a big success. It was held at the Scarsdale Golf Club, with Al Glassett '20 and Larry Davis '22 as hosts; about 75 ambitious, would-be golfers trod the turf, digging divots, planting golf seeds, and imbibing in convivial fun. When I tell you that your humble Secretary managed to eke out three golf balls as a prize, need I say more about the caliber of the golf? As usual, it paid the hosts to entertain us, and as Larry knew just about every rough and hazard on the course, he made out in his usual good manner. Dave Minton '22 led the piano playing, and Doc Duff '86 took first prize for being the most recent graduate in attendance. More power to you, Doc, and we hope you will keep coming to these outings. And, while speaking of the rascal (Doc Duff), I know all will be delighted to learn that he has progressed so well in his recovery that he has recently taken a trip to Peabody, Mass., whence he writes that he is going fine and furnishing the jokes for most of the parties in the old Bay State.

Alumni Day in Cambridge on June 14 was a grand triumph, and the Class of 1922 had a record turnout of nearly 250 members. Uncle Gawge Dandrow '22, Willie the Muse '22, Sam Reynolds '22, and many other bigwigs of that mighty war class were on hand to wear out their steins and

join in what they called song. But nobody was listening to anybody but himself, and perhaps the speakers, so what's the difference? We are very proud to have one of the vice-presidents of the Alumni Association, George Dandrow, from our Club.

My notes are a bit brief on the August outing, sponsored by Bill Mueser at the Mount Kisco Country Club. I understand that about 30 golfers descended upon the terrain, and that outside of a shower or two (external), all went well.

On September 18, George Ruppert, President of the Jacob Ruppert Brewery, was host for our first annual Stein-and-Steak dinner. Everything was on the house, and about 200 members and nonmember Alumni guests were on hand to enjoy the fun. Sam Reynolds '22 and Jimmie Walker '26 were cochairmen of the occasion; and when the last straggler closed the place up, it was just about unanimous to "make mine Ruppert." Special steins were passed out to those attending.

The fall smoker will be behind us when these notes appear, but just bear in mind that this year promises to be one of the most active we have undertaken since the war. The fall bridge tournament is getting under way, directed by Mike Radoslovich '26 and Andy Mooradian '34. Call the former at Kahn and Jacobs, or the latter at Pacific Mills. It will run during October and November. Last, but the climax of the year, will be the annual dinner for President and Mrs. Compton at the Hotel Biltmore on Tuesday, December 9. Mark your calendar now, and don't miss it.

New members include Fred Grossfinger '38, Horace Hardy '47, Don Henderson '25, James A. Lyles '27, Milton McGuire '41, John Plantinga '45, and Andrew M. Vallone '44. Since the last Review, we have been advised of the death of the following members, which we announce with deep regret: William H. Humphrey '05 on July 29, 1945, Charles W. Whitall '15 on June 14, 1946, Graham Harris '13 on September 3, 1946; and in 1947: Robert J. McDermott '45 on February 10, Cyrus H. Hapgood '00 on July 12, William J. Knapp '06 on July 19, Robert A. McMenimen '14 on July 30, and George W. Kittredge '77 on August 22. Our deepest sympathies are extended to the families of these members. — WILLIAM W. QUARIES '24, *Secretary*, McGraw-Hill Publishing Company, 330 West 42d Street, New York 18, N. Y.

### M.I.T. Club of Philadelphia

The current season opened in Philadelphia with a novel meeting held at the Brewery Tavern on Tuesday, September 23. There were no speakers, no formal dinner, and no entertainment. On the other hand, we had plenty of bull, buffet supper, and free beer. It was the first opportunity in years for the Philadelphia Alumni and their guests to get really acquainted at a club function, and judging from firsthand reports, it was highly successful. Our Secretary is now preparing a questionnaire to be sent to the 60-odd men who attended the affair in order to determine exactly how well they enjoyed it and how future smokers might be arranged to provide even greater satisfaction.

Although some meeting cards were not turned in after the smoker, we believe the

following list of men present to be accurate: 1905: Renshaw Borie; 1915: H. W. Anderson, E. A. Whiting; 1916: W. B. Leach (Austin, Texas); 1917: A. C. Carlton, Garland Fulton, R. A. Pouchain; 1918: O. D. Burton; 1922: H. S. Dimmick, N. J. Greene, D. N. Shaw, C. W. Stose; 1923: S. D. Hartshorn, E. J. Healy, F. H. Travers; 1924: R. W. Ambach (Providence, R. I.); 1925: R. E. Cernea; 1926: R. W. Richardson, F. E. Washburn; 1928: H. F. Lathrop; 1930: A. S. Ackiss; 1931: A. D. Bertolett; 1932: F. S. Chaplin, Leo Tyburski; 1933: C. E. Miller, M. H. Piskadlo; 1934: J. A. Drankowski, S. B. Jacobson; 1935: G. R. Bull, Jr.; 1936: N. A. Copeland, J. A. Myers, M. C. Rulon; 1937: A. E. Reinhardt; 1938: D. P. Burleson, R. C. Eddy, F. E. Ray; 1939: W. F. Corl, Jr., J. L. Cushnie, A. W. Gabriel, Jr., B. A. Kleinhofer; 1940: D. G. Bry, J. A. Eaton; 1941: S. K. McCauley, H. R. Moody, J. S. Thornton; 1942: Trowbridge Kennedy, E. W. Smith, Jr.; 1943: S. P. Higgins, Jr., R. N. Lovett; 1944: G. V. Cici, V. S. Ezykowski, R. G. Fisher, G. V. Land, C. V. Lynch; 1945: A. F. Hahn, Jr.; 1946: R. L. Ballman, R. E. Drexel, C. J. Fisher, F. R. Innes, W. H. Peirce; and 1947: J. J. Ferencsik.

The Philadelphia Alumni will miss several members who have moved out of our area. A. B. Cummins '32, formerly assistant professor of industry at the Wharton School, University of Pennsylvania, has taken up his duties as professor and head of the department of industrial organization and management in the school of business administration at Western Reserve University at Cleveland. Our former song leader, Osgood W. Holt '17 now makes his headquarters with the Du Pont Company at Union City, N. J. L. R. MacAdam '27, formerly at the Frankford Arsenal, is now attending the Naval War College at Newport, R. I., for a year. We hope that our members who have gone afield will have the best of luck and that they will stop in to see us if the third Tuesday of October, January, or May finds them in Philadelphia. — ROBERT M. HARBECK '28, *Secretary*, 605 Foss Avenue, Drexel Hill, Pa. *Assistant Secretaries*: SAMUEL K. McCUALEY '41, 288 Copley Road, Upper Darby, Pa.; WILEY F. CORL, JR., '39, Box 358, Bryn Mawr, Pa.

### M.I.T. Club of Western Pennsylvania

The first meeting of the 1947-1948 season, a picnic held on the estate of Joe Thistle '32, was attended by 39 members and five students at the Institute, as guests of the Club.

Arrangements for the picnic were made by the entertainment chairman, George Hoffman '28, with the able assistance of our President, R. G. Lafear '19, and our host, Joe Thistle. Badminton and other outside activities were enjoyed. After an excellent buffet supper, the group congregated in the game room for cards, pool, and general sociability. No formal business was conducted. — WILLIAM J. BATES '35, *Secretary*, 141 Woodhaven Drive, Pittsburgh 16, Pa.

### M.I.T. Club of Rhode Island

The annual meeting of the Club was held at the Rhode Island Country Club on June 12. Cocktails preceded an excellent dinner,

after which 30 members and guests enjoyed poker and bridge. The following officers were elected for the 1947-1948 season: President, Royal Sterling '23; Vice-president, Wheaton H. Hutchison '27; Secretary-Treasurer, Frank J. Dunn, Jr., '39; Permanent Honorary Treasurer, Preston Richardson '92; Representative to Alumni Council, J. Douglas Robertson '16; Corresponding and Publicity Secretary, John M. Hanley '18.

During the meeting, our retiring President, Al Puschin '28, paid a glowing tribute, and all present rose, in honor of the retiring Treasurer, Preston Richardson, who has served as a club officer for more than 15 years. His election to the office of permanent honorary treasurer was enthusiastically greeted.

At this annual meeting the following members were present: Preston Richardson '92, Carl Lovejoy '10, Burleigh Cheney '11, Charlie Maguire '11, Henry Wood '11, Douglas Robertson '16, Jack Hanley '18, Art Wales '19, Jim Entwistle '21, Royal Sterling '23, Frank Barrett '24, Tom Johnson '24, Harold Creedon '27, Wheat Hutchinson '27, Bill Gould '28, Tom Larson '28, Al Puschin '28, Russ Murphy '33, Len Shapiro '34, Bud Dunn '39, and Jack Waller '41.

On July 30, club members and their wives and guests had a pleasant nautical evening on moonlit Narragansett Bay. At this writing the next event on the year's program is the annual clambake on September 13 at the Warren Rod and Gun Club. The ladies are invited.

For the benefit of Rhode Island readers of The Review who have not enjoyed the privileges of this Club, we usually have but one technical meeting during the year, the other half-dozen being devoted to relaxation and good fellowship. The reasons for our lack of stress on the technical are the considerable activity and technical meetings of the Providence Engineering Society, of which our Club is an affiliate. Most of our members attend the Engineering Society meetings, and several of them are past presidents of the society. All M.I.T. men in Rhode Island and in the Massachusetts towns in the vicinity of Providence are invited to join our group. We suggest that you get in touch with any of the officers. — FRANK J. DUNN '39, *Secretary*, 12 Fairview Avenue, Edgewood 5, R. I. JOHN M. HANLEY '18, *Review Secretary*, 78 Waterman Street, Providence, R. I.

### M.I.T. Club of Schenectady

On Sunday, August 17, the Club held an outing at Lake Luerne. Mr. Harry Chestnut (Hal's father) very graciously donated the use of his spacious new camp at the lake, and many of the Tech men spent considerable time admiring the artistry of the masonry and general construction of this very beautiful camp. The day proved to be a beautiful one, and the Alumni spent most of the time out of doors, swimming, pitching horseshoes, playing baseball, or merely lying around. Hal Chestnut was successful in inveigling a few of the more ambitious individuals into spending a little time, hip-deep in water, raking the beach and helping to make a clearing for swimming in front of the camp. Alumni in attendance, for the

most part with their wives, were Fred Barrett '34, F. W. Baumann '33, Don Berkey '42, Hal Chestnut '39, Leo Dee '35, M. J. Hook '42, Dave Jealous '44, Stan Porosky '43, Joe Quill '42, and Bill Rodeman '44.

At the recent club elections, Hal Chestnut was re-elected president, and J. S. Quill was re-elected secretary-treasurer.

On September 23, the fall series of luncheon meetings was initiated. It was decided to try a little different kind of meeting; namely, a round-table discussion with no formal speaker invited. The subject on this occasion, over which Stan Porosky presided, was "What Is the Purpose of an Alumni Association?" In the limited time at our disposal, we were not able to do much with the problem in hand, but we did accomplish the purpose of the meeting — to stimulate interest in the subject in preparation for the coming meeting at which H. E. Lobdell '17, Executive Vice-president of the Alumni Association, is to speak at our local Club. Mr. Lobdell will discuss this subject further with us when he visits Schenectady on October 16. — JOSEPH S. QUILL '41, *Secretary*, 226 Jackson Avenue, Schenectady 4, N.Y.

### M.I.T. Club of the Connecticut Valley

The Club met on May 28 at a dinner meeting at Tinti's Restaurant, 22 King Street, North Agawam, Mass., for the annual meeting and election of officers. The following officers were elected for the year 1947-1948: President, Albert D. King '32, 64 Harrison Avenue, Northampton; Vice-president, Basil G. Constantine '26, 51 Converse Street, Longmeadow; Secretary, Minot R. Edwards '22, 1903 Westfield Street, West Springfield; Treasurer, Thomas W. Hafer '35, 156 Maple Street, Springfield; executive committee for three years, Theodore Lange '01, 62 Massachusetts Avenue, Springfield; for two years, Willard A. Emery '21, Worthington Pump and Machinery Corporation, Holyoke; for one year, Ralph E. Curtis '15, 35 Rogers Avenue, West Springfield. It was agreed and voted that because of the high expense of mailing to inactive members, all Alumni in this section whose names are on our records should be sent the first regular mailing of the year. After that, however, and throughout the year, meeting notices will be sent only to those who have paid the dollar for mailing costs requested on September 1 and considered a membership fee. In accordance with this action by the executive committee and members present at the meeting, all Alumni resident in the Connecticut Valley are requested to mail in to the Treasurer (if they have not already done so) their one-dollar mailing fee in order not to miss notices of the meetings.

Among the members who attended the meeting were the following: Robert C. Albro '07, John A. Berges '40, Basil G. Constantine '26, Ralph E. Curtis '15, Herbert H. Dakin '99, Minot R. Edwards '22, Willard A. Emery '21, John A. Facey '21, H. Roy Harris '24, Albert D. King '32, Theodore F. Lange '01, Jack Lurie '24, Robert Q. McDonnell, Jr., '40, Leonard O. Mills '11, Edwin C. Paul '14, C. W. Rieser '13, Donald L. Ross '27, Irving H. Small '38, and Maurice D. Triouleyre '32.

The club executive committee met at the home of Theodore Lange '01, on August 15, and again on October 4, to check the club mailing lists and those who have supported the Club in the past years. The club officers and executive committee voted to put on an intensive drive to have as many resident Alumni as possible become sustaining members by paying their assessment for mailing expenses and decided that all members were to be mailed a notice of this action.

The first meeting of 1947-1948 was scheduled for October 15 at the Club Silhouette, on Columbus Avenue, just over the Longmeadow line at the Connecticut State line. The meeting was to be a ladies' night, with Vice-president Lobdell '17 of the Alumni Association as our guest. Three reels of sound travel movies were to be put on by Ralph Curtis '15. The Club has been fortunate enough to secure President Compton as the speaker for January 15, the date of a joint meeting with the Western Massachusetts Engineering Society and the Western Massachusetts section of the American Society of Mechanical Engineers. President Al King has scheduled two scientific meetings, for March and May, 1948, each on the second Wednesday of each month.

The Secretary is glad to announce that Basil Constantine '26 has been recommended by the executive committee for appointment as the representative to the Alumni Council representing this Club. (Basil has been confined to the Naval Hospital at Chelsea, with disabilities resulting from war service, but is recovering at home.) — MINOT R. EDWARDS '22, Secretary, Holyoke Heater Corporation, 54 Waltham Avenue, Springfield 9, Mass.

### Washington Society of the M.I.T.

On May 22, the Society assembled for lunch at the United States Naval Gun Factory in Washington, D. C. We enjoyed the nicely decorated dining room of the officers' mess, which is finished in a deep blue. The colorful but restful atmosphere gives no hint of the bustle and gigantic machinery grinding away outside.

After lunch, President Mehaffey '17 called for the annual secretary's report from Jack Plugge '29. Although the membership of the Washington Society changes rapidly, the numbers stay fairly constant. We have a net gain of 37 men over last year but an active membership of 236. Our financial status is good, too, according to the report from Fred Moss '32, read by Bill Mehaffey.

Bill MacMahon '22 presented the report of the nominating committee, which was at once considered a slate for next season. A single vote elected the following officers for the 1947-1948 season: Albert E. Beitzell '28, President; Robert K. Thulman '22, First Vice-president; George D. Mock '28, Second Vice-president; John A. Plugge '29, Secretary; Nicholas P. Stathis '29, Assistant Secretary; Albert F. Bird '30, Review Secretary; Frederick M. Moss '32, Treasurer; A. D. Beidelman '15, Assistant Treasurer. Additional members of the executive committee were elected as follows: W. C. Mehaffey '17, F. W. Turnbull '30, P. L. Dougherty '97, W. K. MacMahon '22, J. A. Mathews '30, and J. E. Greenhalgh '39.

The assistant superintendent of the Naval Gun Factory, Captain Weatherspoon, greeted us and presented his staff, who spoke briefly on planning, design, production, and functions of the gun factory. There the Navy builds its guns, optical equipment, and gun mounts, and makes some ammunition. Repairs and maintenance of ordnance equipment constitute a considerable portion of the factory's work. In addition to strictly naval work, the gun factory performs tasks for other government agencies in Washington. Thus the plant is really a facility for the entire Federal service.

A carefully scheduled tour of the plant followed the talks. Split into two groups, members visited the more spectacular shops. The gun factory makes prototypes of new model ordnance models and, if small lots are needed, produces the entire programs. Large lots are farmed out to private industry with plans, tooling, and prototypes produced by the gun factory. We saw many sorts of armament in production in various machine shops, foundries, and forging facilities. In the big gun shop was a damaged 16-inch rifle from the *South Dakota*. The barrel bore a dent from a direct hit by a Japanese bomb. The master mechanic showed us the rifling operation on a 16-inch gun and the gigantic electric furnace extending more than a hundred feet into the ground, where the rifles are heated during retubing.

Present were the following: G. W. Stone '89, G. W. Stose '93, G. N. Wheat '04, F. W. Milliken '04, D. P. Gaillard '11, M. C. Mason '12, A. D. Beidelman '15, F. P. Upton '16, C. C. Gager '17, W. C. Mehaffey '17, H. D. Manuelian '18, Richard McKay '21, W. K. MacMahon '22, L. F. Kreek '25, H. E. Weihmiller '25, C. G. Moody '26, J. A. Plugge '29, N. P. Stathis '29, A. F. Bird '30, J. A. Mathews '30, J. F. Gamber '31, Lester Glickman '32, Will Lyons '38, W. C. Sadler '44, and E. J. Chapin '45. — JOHN A. PLUGGE '29, Secretary, 35 Oxford Street, Chevy Chase, Md. ALBERT F. BIRD '30, Review Secretary, 5070 Temple Hills Road, Southeast, Washington 20, D. C.

### CLASS NOTES

#### 1877

The Review learns with sorrow of the sudden passing on August 22 of George Watson Kittredge of Yonkers, N. Y., Secretary of his Class and class representative on the Alumni Council, and from 1907 to 1912 a term member of the Corporation. It was during Mr. Kittredge's term on the Corporation and with his enthusiastic support that the decision was reached to move the Institute from Boston to its present site in Cambridge. His death, at the age of 90, together with that of James Atherton on August 3, leaves only two living members of the Class, William Henry Beeching, President, and Frank Irving Sherman.

Mr. Kittredge, well known for a distinguished career in the railroad industry, was born in North Andover, Mass., and prepared in the public schools there for matriculation at Technology in Course I. We are told that as a farm boy he raised, trained, and drove over the road to Boston,

a yoke of oxen to be shown in the Boston Farm Show during the late Sixties and that these animals won the first prize. He married in 1888 Georgia Davis of Louisville, Ky., who died 20 years ago. His two children, Mary, now Mrs. Denman McNear of Petaluma, Calif., and George Davis Kittredge of San Juan, Puerto Rico, survive him.

Mr. Kittredge's railroad service began in 1880 with the position of division engineer for the Pennsylvania Railroad west of Pittsburgh. In this capacity he had to shoulder full responsibility on the occasion of the great Johnstown flood of 1889, which obliterated many miles of four-track line and caused the death of 2,300 persons. During the same decade, he was for six years a consultant for the Louisville Bridge Company. In 1890, he became engineer in charge of maintenance of way, and assistant chief engineer of the Cleveland, Cincinnati, Chicago and St. Louis Railway. In 1891, he was promoted to the duties of chief engineer of the "Big Four," a position he held until 1906, when he was made chief engineer of the New York Central Railroad. Thus his retirement at the end of 1926 terminated 36 years of service for the New York Central System.

Mr. Kittredge was active in the construction of the Grand Central Terminal in New York and in the planning of its underground tracks and approaches — to the extent that the stairs in the terminal are said to resemble in design those of his boyhood home in North Andover. The complete plans of the New York City West Side and Hudson River Improvement, nominally the work of the City of New York, were prepared in his office and under his supervision. He was also concerned in the preparation of the approaches to the Smith Memorial Bridge at Castleton and the yards at Selkirk, and the Albany freight terminal. During World War I, he was one of the three members of the budget committee for the director-general of railroads. Shortly before his retirement, he represented the New York Central at hearings of the Joint Legislative Committee on Grade Crossings.

Mr. Kittredge was a member and former vice-president of the American Society of Civil Engineers, a charter and honorary member, director, and former president of the American Railway Engineering Association, and a fellow of the American Association for the Advancement of Science. He belonged also to the New York Society of the Order of Founders and Patriots of America, the Society of Mayflower Descendants, the National Society of Puritan Descendants; and to the Fortnightly Club for the Study of Anthropology, and the Engineers Club of New York.

As a hobby, he bred and raised carrier pigeons — one of them a bird which for many years held the world's record for a flight of 1,000 miles. Birds of his breeding saw service in both world wars, and in 1918 it was one of his pets that brought the first message out of the front line trenches.

#### 1885

Three other losses from our ranks must be noted. William D. Fuller, born at Deerfield, N. H., on November 26, 1860, died on June 19 at Arcadia, Calif. Leaving the Institute after one year of attendance,

Fuller entered Bates College, from which he was graduated with the class of '85, receiving a B.A. degree. After a few years in government service, he spent the next 10 years in preparation for the ministry, and work therein, becoming a D.D. In 1899, Fuller re-entered the Weather Bureau branch of government service. His work carried him from one end of the country to the other for more than 30 years. At one time he was stationed for a year on Pike's Peak, but most of his time was spent on the West Coast. In 1926, Fuller retired and for many years made his home in Inglewood, Calif. After the death of his wife, and in failing health, he went to live with a son in Arcadia.

During his stay at Technology he was in the heavyweight tug-of-war team and injured his spine, which laid him up for a while. In 1905, he preached in Baptist churches in Boston, Cambridge, and Watertown while the regular incumbents were away. The writer was out of town nearly all that summer on business trips and thus has never seen him since Tech days, but we had a desultory, though interesting, correspondence.

Morris L. Greeley died in November, 1945, presumably in Chicago, Ill. I believe he founded the Greeley-Howard-Norlin Company in Chicago. His family sent me no particulars. William H. Eddy died in Fall River, Mass., on March 11. He was a retired overseer of carding in the Fall River mills and a member of Ascension Church. I had not seen either of these men since we all left Technology, so have little personal information. — ARTHUR K. HUNT, *Secretary*, Longwood Towers, Brookline 46, Mass.

## 1887

In the autumn days of 1883 the largest freshman class of record registered at the Rogers Building. There were 263 of us. Many were specials, not intending to complete the course but listed as '87 men. At certain five- and ten-year periods a diminishing number of survivors met, cementing the bonds of friendship at those times. In 1927, at our 40th reunion, about 40 of us met at Waltham, though for one day we were at Cape Ann. A clambake feast! At our 50th in 1937, we met at Marblehead. Only 26 men were present, but the wives and relatives swelled the number to 38. In 1942, our 55th, at Plymouth, the number had diminished to 16.

In the last five years we have lost our President, Giles Taintor, our Secretary, Nat Very, and our Treasurer, Winthrop Cole. As a Class we had lost our organization. Realizing that we needed a head, a few of us appointed Richard E. Schmidt as president. Ably assisted by Ames Carter, he circularized all known living '87 men, and the result was that nine men presented themselves at our 60th reunion and class dinner at the Beaconsfield Hotel in Brookline on June 15. At least a dozen others sent letters of regret. And a few others, because of the infirmities of old age or for other reasons, were prevented from writing.

Those in attendance at the class dinner were Franklin Brett, Julian Cameron, Ralph Curtis, Ames Carter, Lonsdale Green, Frederick Kendall, Oscar Nutter, Harry E. Smith, and Richard E. Schmidt. The wives of Mr. Carter and Mr. Cameron

graced our table, and the granddaughter of Mr. Green came over from Wellesley to add the vivacity of youth. Mr. Kendall's niece also was present, having ably assisted in conducting her uncle over from Newton. Class reunions are generally held at a distance from Boston as being conducive to conviviality and away from the attractions of a big city. But it was a lucky stroke for us that we chose Brookline. It was suburban enough to suit and yet convenient enough to the commencement activities in Cambridge and at the Statler Hotel. Most of us stayed in Brookline three full days.

We were informed that no other class before 1887 had kept its organization and held a 60th reunion. As individuals, many preceding these '87 men had attended commencements. In years to come, there will probably be other 60-year meetings. The records of recent years show that the classes have increased in size, and it is a fact that in modern times men live longer. So we may have set an example for others to follow: "The tree of deepest root is found/Least willing still to quit the ground." — LONSDALE GREEN, *Acting Secretary*, 5639 Kenwood Avenue, Chicago 37, Ill.

## 1888

Sam Wheeler, a noted waterworks engineer, from whom we had not heard for 59 years, died on April 13. Our second decennial record in 1908 listed him as superintendent and manager of the Ashland Water Company, with which he had remained since the previous report, and as secretary and treasurer of the C. E. Bretting Manufacturing Company of general milling and mining machinery in Ashland, Wis. It named five children, at that time respectively 17, 16, 14, 12, and four years of age: Ruth, Helen, Robert, Mary R., and Theodore.

Our President, Edwin S. Webster, with whose retirement from Stone and Webster we dealt at some length in the July issue, was again mentioned in the Boston *Herald* on August 26 as celebrating on that day his 80th birthday. The item named his directorships in Stone and Webster; the United Fruit Company; the Pacific Mills; the Chicago, Wilmington and Franklin Coal Company; the Tampa Electric Company; the Eastern Gas and Fuel Associates; and the Boston Consolidated Gas Company.

We were happy to receive a letter from Mrs. William G. Snow, widow of my predecessor as class secretary, written from Duxbury on August 10. On their children and grandchildren she reports as follows: "My daughter, Elizabeth Chandler, her husband and son are in Duxbury this week, and although not with me but visiting friends, will spend a day or two here. Her son, my oldest grandchild, 19, and a junior at Dartmouth in October, has a summer job in Plymouth with the Gas and Electric Company. He stays overnight here, going off early in the morning, but manages to have a good time, especially on week ends. Her daughter, 13, is at camp. Eleanor Gray, my younger daughter, is just out of the New York hospital after four months' treatment for a back injury. Six years ago she fell down some stone steps and fractured her spine, had a suc-

cessful fusion operation, and had been active ever since, until she slipped on the bathroom floor and broke the graft, and it had to be done all over again. She now has had five operations. The wound is not yet healed, but they decided she would be better off at home, where she could be out of doors. She has two boys, and her husband, John Gray, Jr., is a busy lawyer with the Elihu Root firm. Bill . . . married again and now has three young children, eight, five, and nearly three, and is still busy as president of the Middlesex Products Corporation, thus far keeping up its traditions of paying dividends."

Of our classmates, Mrs. Snow has the following to say: "John Runkle hasn't been down this summer, but all his houses are rented. Charlie Sabine is over 80. He works around his place, has chickens, and grumbles because he can't do more. . . . I am sure you are doing well as class secretary. Will always enjoyed that work. I shall never get over losing him."

Fred Nichols wrote from the Gladstone Hotel in Chicago on June 6, covering the whole situation so comprehensively and characteristically on one postal card that we can't resist presenting it verbatim, as follows: "Tomorrow, June 6, I get my old room of last summer, with Lonsdale Green at 5639 Kenwood Avenue, Hyde Park 1670, Chicago 37. Rooms very scarce, many friends helping. Had fine trip, many short tunnels through Kentucky mountains. Left Orlando Saturday noon. Fine weather till Sunday midnight, then rain, 1.64 inches till 6:00 A.M. Monday, then heavy fog to Chicago, 1½ hour late 9:00 A.M. Cold, but I had raincoat. O.K. Bought topcoat Tuesday. Terrible winter here, no spring, rain all the time, no corn planted. Fields covered with water. Schools are rushed to death. New superintendent appointed yesterday. Perhaps a New Era! Annual dinner with bunch men principals Wednesday. Another today with retired principals. I'm warming up inside. Several of my old teachers been here to hotel. Always feeling fine. Get about nicely. Stay north till November, then back to my grand room, 1112 Mount Vernon Avenue, Orlando. Plenty of light, heat, sympathetic care. May go East this summer. Forgot my pocket address book, am sending for it." — BERTRAND R. T. COLLINS, *Secretary*, 291 Nassau Street, Princeton, N. J. SANFORD E. THOMPSON, *Assistant Secretary*, The Thompson and Lichtner Company, Inc., Park Square Building, Boston 15, Mass.

## 1889

The following clipping relating to disposal of the home of our late classmate, John Hyde, at Bath, Maine, is from a lavishly illustrated article in the Bangor *News* of June 1: "Elmhurst, the palatial residence of the late John Sedwick Hyde of Bath, constructed as a sort of private PWA project in 1913-1914, when workers outnumbered available jobs, is again to become the center of gaiety. The scene of many lavish social events, built at an estimated cost of a half million dollars, has been taken over by the Pine Tree Society for Crippled Children — an outright gift of the three Hyde granddaughters, Mrs. Jane Hyde Fenn, Mrs. Nancy Hoggard and Mrs. Sally Hyde Knights. In this one gesture were fulfilled two dreams, that of

the Hyde grandchildren in finding an organization capable of keeping up the estate while deriving its benefits, and that of the Society which had long felt the need of a home for convalescent children, one that would enable them to live as other children live. Elmhurst, made to order for the purpose, situated on spacious grounds, is of brick construction, fireproof throughout, has numerous porches, and a solarium which will be ideal for sun treatment. The building is equipped with an elevator, ready to be of service for wheelchair patients, and has 17 rooms which are readily convertible into several times that number of smaller sizes. Constructed by John Calvin Stevens, a fellow in the Institute of Architects, and his associate, John Howard Stevens, the mansion boasts a large ballroom on the third floor, a swimming pool in the basement, a large library and a lobby. A completely equipped greenhouse is included, with opportunity for flower and vegetable gardens where the children who are physically able will have opportunity to learn horticulture and work in the fresh air at light tasks. Of colorful past, the home has witnessed many lavish social events, reminiscent of the Golden Age of classic Rome. Outstanding was the reception in February, 1915, the year following its completion, when nearly 300 of the city's royal purple attended a recital by Madame Emma Eames de Gogorza, Bath's gift to the operatic world, and her equally talented husband, Emilio de Gogorza. Refreshments were served in the dining room by a corps of trained waiters from Boston."

Another recognition, of a different sort, of one of our departed classmates was made by the *Christian Science Monitor* of August 20, which published a very good reproduction of "Waterfront," one of Juddy Wales's best marine etchings, which is now in the Wiggin Collection at the Boston Public Library. — WALTER H. KILHAM, *Secretary*, 126 Newbury Street, Boston 16, Mass.

#### 1890

Only Crane, Goodwin, Sherman, and Packard were present at Technology and the banquet on Alumni Day in June.

Charles Sherman writes as follows concerning Burley's birthday: "It was my privilege to attend a little party in recognition of Harry Burley's 80th birthday, on Sunday, May 25, at the home of his son Joseph (M.I.T. '27). It was primarily a family affair, with Harry's sister, Miss Jane Burley, of Epping, N.H., and his brother, Dr. Benjamin Burley of Worcester, and his wife, as well as Joe and Harry, Jr. (M.I.T. '33), with their wives, and such of the grandchildren as were available. Frank Sanborn of Cambridge, who was a classmate of Harry's at Dartmouth, and I from our Class, were the only ones outside the family. I do not think that many members of our Class know, even today, that Harry went to Dartmouth before coming to Technology. I am sure that I did not know it until years after our graduation. It was especially pleasing that Mrs. Burley felt able to be there and to take an active part in the observance. She has not been in good health for some time, but fortunately was well enough so that she could enjoy her full share of the celebration."

A change in the Alumni Register led to an inquiry which brought the following from Mrs. Sophia Hayden Bennett: "I have not changed my address. I bought my house here in Winthrop in 1900 from an honest man who built it; so today I can stay in an old home and not worry about the rent going up. I added my maiden name to the Bennett in the listing at M.I.T. because my old friends remember me better by that name and my husband has been dead more than 30 years. When I entered M.I.T., my grandfather put \$1,000 in the Provident Institution for Savings for my tuition for the four years. That would not go very far today, and I wonder whether the boys are getting more than we did out of M.I.T. I am very well indeed and should like to stay around a while longer in this most interesting world."

The M.I.T. Register of Former Students has always carried Lemuel B. Holmes as a member of a firm in Rochester, N.H. A new registration slip came in omitting this and the Secretary wrote asking Holmes whether he had retired, to which he replied: "I don't know how anyone who had my address as with Linscott, Tyler, Wilson Company could have waked up to the fact that the firm is nonexistent. It quit in 1932: all persons in the firm are dead. I am the fag end. My only experience at Technology was in the first year. I wasn't well enough grounded. The chance that you and I have to meet and gossip on old times is small, but you have my best wishes and handshake."

The Secretary of the Montana Alumni Association of the M.I.T. writes that William L. Creden '90, who is chairman of that Club, is confined to the St. James Hospital in Butte and a very sick man.

Henry B. Pennell, architect and decorator, died on June 18. After leaving Technology, he studied at the American Academy at Rome and the Ecole des Beaux Arts in Paris and then became connected with the firm of Pennell, Gibbs and Quiring, Inc., in Boston, of which he was president. The Boston *Herald* states: "In addition to his work on Trinity Church, he also designed decorations for the Colonial, Plymouth, Majestic, Wilbur, Shubert and Scollay Square Theatres, and also was widely known for his work on churches, cathedrals, public buildings, etc., throughout the country." A very quiet, rather reticent man, he continued to wear a high collar and a pointed beard to the end. In his early days he was a member of the First Corps of Cadets and during World War I was captain of the Massachusetts State Guard at Cohasset.

Adolph Hallenberg died on February 13. A letter from his wife states that after graduation at Boston in 1890 he went to Europe, where he studied art and architecture in Paris for three years. Returning to Louisville, his home town, he opened an office in which to follow his chosen profession and continued his work in architecture until 1937, when he retired. During the Spanish War, however, he joined the First Kentucky Regiment and was out of the country until February, 1899. He was much loved by all who knew him.

Frank Greenlaw has the sympathy of the Class in the loss of his wife last May. As Emma Kramer, she was a member of the

Class of '94 at Technology. Another recent death is that of Mrs. John DeWolf, who came to many of our early reunions. — GEORGE A. PACKARD, *Secretary*, 53 State Street, Boston 9, Mass. HARRY M. GOODWIN, *Assistant Secretary*, Room 3-233, M.I.T., Cambridge 39, Mass.

#### 1891

Our Class President, Henry Goddard Bradlee, died at his home in Brookline on September 3 after an illness of several months. It is impossible to express the feeling of personal loss that this brings to several of us who have known him since we were in Tech together so many years ago. We shall miss him not only because of his class loyalty, his attendance at all our reunions and dinners, his liberal assistance whenever called upon; primarily, we shall miss him because we liked him and he liked us.

He went to work for Stone and Webster soon after graduation and was one of their top executives at the time of his death. He did much in developing public utilities and service projects for the good of all concerned. He always stood for what was right so far as he knew it, and it is men like Harry Bradlee who have helped make this country what it is today. He was quiet, but very companionable. His dislike of notoriety perhaps made him even more useful in his work and daily life. The Class was represented at his funeral by Young, Brown, Tappan, and Fiske.

The Boston *Herald* of September 5 had the following brief account of his business activities: ". . . Henry Goddard Bradlee, former vice-president and treasurer of Stone and Webster, Inc., and chairman of the executive committee . . . died at his home . . . after a brief illness. His other directorships included Chicago, Wilmington and Franklin Coal Company, Railway and Light Securities Company, Tampa Electric Company, and Fall River Gas Works. He was a trustee of Northeastern University and a member of the corporation and of the vestry of the Church of our Saviour, Brookline. He was a member of the Union, Country and Downtown clubs. Mr. Bradlee leaves his wife, the former Marion Chamberlin; a daughter, Mrs. Roger A. Perry, and a son, Henry G. Bradlee, Jr., both of Brookline."

We lost another good friend and loyal classmate recently in the death on June 17 of Morrill S. Ryder of Middleboro, Mass. He was a regular attendant at all our parties, as our class affairs meant much to him, and we shall miss him. Because of his quiet and retiring nature, it may be a surprise to some who have known him for a long time to realize his many activities. He was a good citizen, active in town affairs and willing to do his part for the good of all. The following passage is from a Middleboro paper: "Mr. Ryder was born in Middleboro on October 25, 1867, the son of Nathaniel F. and Joanna S. (Smith) Ryder and received his early education in the public schools of Middleboro. He prepared for college at the Eaton private school of this town and later attended . . . Technology."

"Upon the completion of his technical training he became identified with the firm of Burbank and Ryder, which concern had paint and varnish factories in Middle-

boro and in Boston. Ten years later, in 1901, he was made partner in the business and elected treasurer and general manager of the organization. From that time to his retirement in 1917, he devoted to the interests of that manufacturing concern ability of a high order and also unwavering faithfulness. He became widely known in his field, and as time passed became officially associated with two other paint and varnish manufacturing concerns, both of which he helped to organize. One was the New England Oil, Paint and Varnish Company, which he served as treasurer from the time of its organization to 1917, when he retired from all active business responsibilities. The other was the Hoffman Paint and Varnish Company, which he continued to serve as a member of the board of directors to the time of his retirement.

"He had always taken an interest in public affairs, and in 1921 he was elected to represent this district in the State Legislature, an office which he filled most efficiently for six years. For more than 20 years he had served as a director of the Middleboro Trust Company and at the time of his death was vice president of that bank. At the Middleboro Savings Bank he served as a trustee for many years. He is survived by four sons, N. Dorrance of Middleboro, Morrill S., Jr., of Wareham, Edwin M. of Carver and Lt. Commander, U.S.N. Reserve, Francis C. Ryder of Woods Hole and nine grandchildren."

We are in receipt of a newspaper clipping, telling of the death of one of our coeds: "Dr. Ethel B. Robinson of 45 East Fifty-fifth Street, New York, widow of Alfred B. Robinson, died here . . . [on July 31] at the home of her son, Horace B. Robinson, after a long illness. Dr. Robinson, the daughter of Samuel Blackwell and the Rev. Antoinette Brown Blackwell, was born in Somerville, N.J. She was graduated from . . . Technology in 1891, did graduate work at Johns Hopkins and received her medical degree from the Medical School of the New York Infirmary for Women and Children, founded by her aunt, Dr. Elizabeth Blackwell, the first woman doctor in this country. She taught at the College of the New York Infirmary, retiring after her marriage to Mr. Robinson. For many years she lived in Montclair, N.J., where she was active in club affairs. Dr. Robinson was a former president of the New York League of Unitarian Women and was the author of two books of religious poetry, 'A Glimpse of God' and 'Religion of Joy.' Besides her son, Horace, she leaves another son, Alfred B. Robinson of Santa Fe, N.M."

Our notes in the last number of The Review mentioned the death of Ralph D. Colburn of Holliston. We had very little information at that time, but since then his son Robert (M.I.T. '23) has written us, and the following information is taken from his letter: "The Class of 1891 lost another of its loyal members on March 12, when Ralph Dickinson Colburn died at the Baker Memorial Hospital after a serious operation. Up to the time of the operation he had been in excellent health and had had sufficient vitality and energy to busy himself with many worth-while projects in Holliston, Mass., where he had spent

most of his life. During the war his enthusiasm and desire to be of use to the war effort, even at his age, prompted him to inaugurate, organize, and operate the Holliston Machine Works, a company which almost overnight employed more than 75 men and worked 24 hours a day, making special small parts for the fire fighting equipment used by the United States Navy. The work of this small organization earned the commendation of both the Navy and the War Production Board. He will be greatly missed by all his friends and associates and especially by his son, Robert T. Colburn '23, now stationed in Augusta, Ga., as engineer for Charles T. Main, Inc., and his daughter, Adelaide Colburn, who made her home with him in Holliston, while teaching in Melrose."

Ernest Hersom was in the East during the summer, and Harry Young gave him and Ernest Tappan a luncheon at the Algonquin Club. Hersom was for years a professor in mining engineering at the University of California and retired some time ago. He lives alone in Berkeley, Calif., overlooking the Golden Gate. He works in the garden, belongs to several clubs, and drove his car across the country and back again, which is more than some of us would want to tackle.

Ed Smith, writing from Providence, has this to say about Harry Bradlee, with which we will all agree: "Henry and I were classmates, both at Chauncey Hall and M.I.T. As a lad, he was of the finest, and he developed into one of the finest of men. With others I grieve this loss. The Class of '91 has lost a worthy president; M.I.T., an outstanding Alumnus."

Frank Howard wrote us in June of his proposed trip to Europe, as follows: "It may interest you to know that I am scheduled for a six-weeks flying trip to England and eastern Europe with a group of 10 professional people visiting the devastated areas and studying their plans for reconstruction. I hope to bring back pictures and a good story. All long-distance travel will be by airplane. We leave New York on August 2 and return about September 12, unless some of the planes should crack up or Russian sympathizers send us to Siberia. We have been informed that we shall be housed and fed comfortably part of the time, but must be prepared to put up with what we can get at other times. I don't regard it as a pleasure trip but as a very interesting experience." How many of us would be able to tackle that job? Frank is the only one I can think of.

Robert Ball sends us another of his interesting letters from Cambridge, England. Here are a few quotations: "In England we feel that, under a change that is catastrophic, too much cannot be done to keep alive for posterity something of the life that once was here. Our National Trust is taking over estates and mansions which, through confiscatory taxation, are no longer tenable by the impoverished owners. They will be preserved for future generations to see and admire when everything else has been smoothed out to a humdrum pattern." He then tells of his efforts at gardening: "If everything were easy, there would be no relief from boredom. Personally, I never feel bored, and I am sure you do not either. With many of the boys of '91 around you, how could you? I wish

there were some here to drop in for a chat and to hear the latest from headquarters — greetings to all."

A letter written by Hanington from Denver during this last summer tells of an interesting visit with Dr. Edgerton '27 of M.I.T., who spent some time in Denver with his flash photography equipment, snapping humming birds with wonderful success. (See article in the *National Geographic* for August.) Hanington says: "Gorham Dana would enjoy them as he is a hummingbird chaser." He also tells of the adventures of one of their directors, Mr. Bailey, who was in New Mexico taking Indian pictures for his lecture series. The same *Geographic* has an account of Bailey's boat trip down the San Juan and Colorado rivers a year ago. As president and head of one of the most progressive museums in the country, Hanington's work is very interesting, and he has contacts with many worth-while people.

Some changes in address are those of Henry F. Noyes to 66 Elmwood Avenue, Bridgeport, Conn., and Ambrose Walker to 5 Carpenter Street, Salem, Mass. — HENRY A. FISKE, *Secretary*, Grinnell Company, Inc., 260 West Exchange Street, Providence, R.I.

## 1892

The program of events planned for the celebration of our 55th anniversary on Thursday, June 12, went through very successfully. Harry Carlson, Channing Wells, Dr. Worthington, and Fuller met at M.I.T. at 9:30 A.M. and drove over the road to George Ingraham's house in Marblehead, where other members of the Class, Ed Hall, Fred Maynard, and Arthur Ober, had already arrived or came shortly thereafter. Mrs. Ingraham very kindly greeted us by serving a tall glass of fruit juice punch with accessories. Afterwards, we all drove down to the pier and boarded the Transportation Company's good launch *Kelpie* for a two-hour trip around the harbor: by the Eastern Yacht Club and the Corinthian Yacht Club landings, out by the old lighthouse and Cat Island to the Baker's Island lighthouse, then over to Manchester Harbor; and back by the entrance of Salem Harbor and Peach's Point to the landing float. The day was perfect, warm and sunny, with a light sou'wester barely sufficient to turn an occasional whitecap. When we got back to the landing, Harry Burnham was there to meet us. Then we all proceeded to the General Glover Inn, just over the Marblehead-Salem line. Incidentally, this inn was the old country homestead of General John Glover, who recruited a regiment of Marbleheaders and led them through the Revolutionary War. He had a summer house near the shore of the harbor and retired to the country house during the winter. At the Inn we were served with an excellent dinner, topped off with a cup of Fred Maynard's finest brand of coffee. The present owner and proprietor, Alexander Little, an old friend of Fred Maynard's, formerly in the business of shoe manufacturing in Lynn, came in near the close of the dinner and entertained us with stories and accounts of the development of Salem and Marblehead in that vicinity. Before leaving, he presented each one of those present with a pound of the above-mentioned coffee.

At the beginning of the dinner, a short business meeting was held at which George Ingraham was elected president, to fill the vacancy which has existed since the death of Scott Parrish. Charles Fuller was formally elected as secretary and treasurer. The Treasurer then reported a balance in the '92 class fund of about \$840, on deposit in the Warren Institution for Savings, where the account had been started by the former Treasurer, John W. Hall. It was agreed that the total of the expenses of the reunion, amounting to about \$50, should be taken out of the class fund on hand.

Letters were received and read by the Secretary from members of the Class who, for various reasons, were unable to attend but who all sent cordial greetings and wishes for the success of the occasion: first, from our honorary member, Miss Julia M. Comstock, elected on the occasion of our 50th Anniversary, and from Mrs. Holman, the former Mary C. Lovering, who was prevented from attending by serious illness, from Mrs. T. M. Keene, and Mrs. M. L. Barton, the former M. L. Coolidge. Then from the following: C. H. Chase, Stoneham; R. D. Chase, New Bedford; A. W. Dean, Winchester; B. P. du Bois, Washington; S. B. Ely, Pittsburgh; G. T. Forbush, Natick; W. W. Green, Redding, Calif.; J. W. Hall, Roxbury, our former Secretary; J. P. Lyon, Norwich, Conn.; A. P. Marsh, West Somerville; H. R. Moody, who now resides in Vienna, Va., since retirement as professor emeritus from the College of the City of New York; C. N. Palmer, Colorado Springs; G. F. Rowell, Philadelphia; W. E. Scales, New York; R. H. Sweetser, New York; Francis Walker, Washington; and E. C. Wells, Dayton. By telephone, the Secretary also received word from H. G. Fairfield that the press of business would prevent him from attending the reunion.

After a very pleasant session of some two hours, we returned to Ingraham's house to express to Mrs. Ingraham our appreciation of her hospitality, and to one another the hope that we all would be around and able to attend the next reunion on our 60th, and left for home feeling that we had spent a wonderfully pleasant day. Before leaving town, Burnham, Worthington, and Fuller made a visit to Abbot Hall to have a look at the famous painting, "The Spirit of '76," and other paintings and antiquities there.

E. C. Hall and Fuller represented the Class at the Alumni Banquet at the Statler on Saturday evening. H. J. Carlson reports that after attending a trustees' meeting at Bates College on Saturday, June 14, he met H. R. Moody and his wife (Edna Wadsworth, M.I.T. '93), at the Eastland Hotel in Portland in the evening, and had a delightful visit with them. Moody was "hale and hearty, full of stories," on his way to his summer place at Sebago Lake.

During the summer the Secretary has received the following items regarding members of the Class: After a long illness, Mary Lovering Holman died at her home in Belmont on August 17. She entered Technology with the Class of 1892 and attended as a special student with us for two years. After leaving M.I.T., she taught at Barnard College, Pratt Institute, and other schools for a number of years. The

Boston *Herald* of August 18 gave the following account: "In 1906, Mrs. Holman became interested in genealogy, and published genealogies of many noted families before her retirement three years ago. She was former co-editor of *The American Genealogist* and recently was elected a Fellow of the American Society of Genealogists. She had been a member of the Daughters of the Revolution Society, Daughters of Founders and Patriots of America, U. S. Daughters of 1812, New England Historic Genealogical Society, New Hampshire Historical Society, Pennsylvania Historical Society, Connecticut Historical Society, and Shropshire, England, Genealogical Society. She leaves only a daughter, Winifred Lovering Holman, a genealogist and biographer, who lived with her mother."

From the Press Clipping Bureau comes the following news of the activities of Ely: Sumner B. Ely, superintendent of the Bureau of Smoke Prevention in Pittsburgh and a graduate of Technology, worked for the Pressed Steel Car Company and later became chief engineer of the American Sheet and Tin Plate Company. He then went to Carnegie Tech as professor in mechanical engineering, where he specialized in fuel combustion. Upon retiring from Carnegie, he became bureau superintendent in 1941. — CHARLES E. FULLER, *Secretary*, Box 144, Wellesley 81, Mass.

#### 1894

Alumni Day has come and gone. Our Class had a small representation. E. M. Hunt, W. H. King, and the Secretary lunched together under one of the umbrellas in the Court and were joined at the dinner at the Statler by N. S. Bean, who came down from Manchester for the occasion. He is still active as president of the Manchester National Bank and in numerous civic and business organizations in that city. Ed Hunt, having served Portland as commissioner of public works until he reached the retirement age, has become one of the group of Stewart Associates, Inc., of Cambridge, consulting and testing engineers, and handles the work of this group in the state of Maine, thus retaining his residence at 118 Eastern Promenade, Portland, as for years past. One of his present jobs is the inspection of the pavement on the new Maine turnpike that will eventually extend throughout the 500 miles from Kittery to Fort Kent. He is also hoping that some of the work at the new big Army bomber base at Limestone may come his way. His long experience and competence in engineering should be a great asset in his new connection. Billy King is as busy and active as ever in his law work in New York, where for years he has been a specialist in tax matters.

The Secretary has exchanged several letters with H. M. Chase, director of research at the big Dan River Mills at Danville, Va. His latest mentioned the possibility of a trip north to go on a tour in the Provinces with Alan Claflin. Alan was recently at Danville on a business trip, and the scheme was cooked up at that time. Alan is one of the few lucky men who has been able to obtain delivery of a new car ordered months ago. This may facilitate the proposed trip and Chase's visit. Alan assures all classmates that a tour of north-

ern New England and the near-by sections of Canada is far more rejuvenating than any formal medical treatment, and in this opinion he has many supporters. It is a pleasure to add that Claflin is one of the few great grandfathers in the Class, as he reports the birth of Christine Heath, daughter of Barbara, who is the daughter of Alan's oldest son, Avery Claflin.

A July letter from J. C. Nowell states that he and Mrs. Nowell expect to spend September in Gloucester and Boston. Having married daughters hereabouts gives them an annual excuse for a trip east. All this will happen before these notes are printed; but it is hoped that a few '94 men can get together while Jack is here; and the Secretary would like to be host in return for Jack's splendid hospitality in the spring, as mentioned in the May Review. Shortly before this letter came a card from Austin Sperry, who was enjoying the High Jinks of the Bohemian Club at their famous grove. His cordial "wish you were here" was greatly appreciated.

Two reprints of recent papers by C. G. Abbot have been received from the Smithsonian Institution, where Abbot has been a research associate since his retirement as secretary of that famous organization. These are in furtherance of his earlier researches on solar radiation in its effect on precipitation. In this field Charles G. is the recognized authority.

Again it is a painful duty to record the passing of several members of our Class. Albert Francis Hunt, Jr., died at Mount Holly Springs, Pa., on April 18, after three months' illness with a heart condition. At the time of his death he was general counsel and secretary of the Eaton-Dikeman Company, large manufacturers of filter paper in that town. Born in Newburyport on September 8, 1872, the son of a former mayor of the city, he was graduated from the Newburyport high school, came to the Institute, completing the Course in Civil Engineering in 1894. After graduation he was employed by the Boston Transit Commission as transitman and draftsman and ran a transit on surveys for the first Boston subway. In February, 1895, he resigned to accept a position with George E. Waring, Jr., who had been appointed commissioner of street cleaning in New York City, and organized the famous "White Wings" group of members of his staff. Hunt became assistant master mechanic. While on this work, he began the study of law at New York University, taking a three-year evening course. At the expiration of Colonel Waring's term, Hunt resigned to devote himself exclusively to law and was graduated in June, 1898, with his LL.B. He practiced law in New York as a member of the firm of Hunt, Small, and Ingle at 96 Broadway. In 1903, he went to Puerto Rico in connection with the affairs of an electric railway projected from San Juan to Ponce, in which both law and engineering were found useful. Later, he returned to practice in New York, and subsequently went to the Dominican Republic, where he was president of a power and light company. Incidentally, being fluent in Spanish, he translated several books into English. Again returning to the States, he was in law practice in New York and Boston for several years. Later he removed to Philmont, N.Y., where he was connected with a large

artificial leather manufacturing company. For the last seven years he had been a resident of Mount Holly Springs. He is survived by his widow, who was Marianne Violette, a native of Maine, to whom we express the sympathy of the Class. He was buried in the family lot at the Oak Hill Cemetery in Newburyport. The Class has lost another brilliant and versatile member, and it is our sorrow that he could not have been with us at our reunions.

With great regret the Secretary reports the death of another of the distinguished women who was for a time associated with our Class. Mrs. Frank M. Greenlaw, of Newport, R.I., died on May 2 after a long illness. As Emma Viola Kramer, she became a special student in Architecture and was for two years at the Institute. In 1895, she married Frank M. Greenlaw '90, who had been an instructor in the Department of Mathematics and for many years was head of the science department of the Rogers High School at Newport. Mrs. Greenlaw was very active in the artistic and civic life of the city. A founder of the Newport Art Association, a post regent of the Daughters of the American Revolution, a past president of the Current Topics Club, and interested in the affairs of the United Congregational Church, she also found time to help friends in the planning of their houses and to devote herself to landscape and still-life painting, both in oils and water colors. She was a native of Maine, the daughter of James W. and Mary J. Cookson. The Class is proud of her fine career of public service and deeply sympathizes with her husband in his great loss after 52 years of happy companionship.

In the class notes for January, 1946, was a one-column account of the career of Arthur La Motte, who for years had been the expert on explosives for the Du Pont Company and had had many interesting and hairbreadth experiences. It is with very great regret that his death, at Oakland, Calif., on July 17 while on a visit at the home of his nephew, is now recorded. The son of Robert S. La Motte, he was born on June 23, 1871, at Fort Bridger, Wyo. La Motte attended Phillips Andover, entered the Institute in 1890, and left the following year to study medicine at the University of Pennsylvania, but was not graduated. His early interest in dynamite and other explosives determined his life work. For several years he was a research chemist with the Repauno Chemical Company at their dynamite works near Gibbstown, N.J. He invented a nonfreezing dynamite in 1903, and this was followed by many other inventions relating to the use of explosives. He made the first T.N.T. produced in the United States and made many other important advances in the field of explosives. He edited the nine editions of the *Blasters' Handbook*, and wrote most of the chapters on explosives in Peele's *Mining Engineers Handbook*, and most of the publications on *Safety in Use of Explosives* for the Institute of Makers of Explosives. His prize paper on "Proper Detonation of Explosives" proved for the first time the directional effect of explosives. He lectured widely to technical groups, to Army Engineers and at the War College, visited the plants of manufacturers in Europe, and for 23 years was manager of the technical section on explosives for the Du Pont

Company, devoting his time to research even after his official retirement. He leaves a widow, the former Katherine Jackson, a brother, Lieutenant Colonel C. K. La Motte of San Diego, and the nephew, Dr. Robert S. La Motte of Oakland.

Through a letter from Mrs. La Motte, we learn that Joseph Earlston Thropp, Jr., died on June 26, at his home at the Hotel Alexander, Hagerstown, Md. After what was presumably a very brief illness, he was with us at the 50th anniversary of the Class and was then in good health and manifested his usual deep interest in class matters and also in his professional work with the Fairchild Aircraft Division, in the production planning department, a position which he held until his death. Joe, as we familiarly called him, was a native of Philadelphia, where he was born on February 10, 1874, the son of Joseph Earlston Thropp. He attended the William-Penn Charter School, entered the Institute in the fall of 1890, and took the Course in Mining Engineering, as the family interests were in the iron mining field. Graduated in '94 as one of the youngest members of the Class, Thropp at once became assistant superintendent of Everett Furnace at Everett, Pa., and was made superintendent in 1895. Then began a rapidly extending career, as he was made general superintendent of all divisions of the company in 1896, and general manager in 1898, a position which he held for five years. In 1903, he entered the employ of the Carnegie Steel Company at Duquesne and in the following year was put in charge of all work of the company at Donora. From 1907 to 1910, he was general manager of the Joseph E. Thropp, Earlston, and Saxton furnaces, coal and coke properties, and iron mines at and near Everett, Pa. These were evidently companies in which there was a controlling family interest.

In 1910, he became superintendent of the Thomas Iron Company at Hokendauqua, and a year later he had become superintendent for the Inland Steel Company, the large furnaces of which were located at Indiana Harbor. Here he remained until 1914 or 1915, when a breakdown in health forced him to seek rest and medical care. Recovering his health, he became superintendent for the American Rolling Mill Company of Columbus, Ohio, during World War I, and for a year or so following. He then retired from active professional work and was a "gentleman of leisure" for several years. He and his charming wife, whom he had married in 1908 or 1909, set up a delightful home in Hagerstown, Md. Here he found an opportunity for service in the engineering department of the Montgomery Company for a few years, and with the advent of World War II, he became associated with the Fairchild Aircraft organization, a position which he held until his lamented death in June. His funeral services were conducted by the Bishop of Maryland, assisted by the rector of St. John's Episcopal church, of which he was a communicant; and burial was in Rosehill Cemetery in Hagerstown. The Class will remember him with affection, and for them the Secretary extends deep sympathy to Mrs. Thropp.

The Secretary must also report the death of another of our highly regarded and widely known classmates, Luther Roberts

Nash, of Ridgefield, Conn. A few months ago mention was made of his latest book, *Anatomy of Depreciation* published by Public Utilities Reports, Inc., in 1947; now it is a sad duty to record something of his life and service. In his professional life he acquired a wide reputation as an expert in public utility rates and finance, but we think of him also as a classmate of high character, warm friendliness, and intense loyalty. He died at Ridgefield, his native place, on August 10, as the result of a cerebral hemorrhage after an illness of but one day.

Luther Nash was born on January 22, 1871, son of John D. and Sarah Jane (Holmes) Nash. As a boy he helped in his father's store and then attended Williston Academy at Easthampton, Mass., finishing there in 1890, and then entering with the Class of '94 at M.I.T., where he took the Course in Electrical Engineering. On graduation, he took a summer job in charge of the electric lighting plant at Colebrook, N.H., then returned to Cambridge and spent an academic year in the graduate school at Harvard, for which he was later (1898) awarded an S.M. degree. In 1895, he entered the employ of Stone and Webster, where his early work included the design of electrical installations, supervision of construction, and engineering management. In 1904, he became manager of the Savannah Electric Company, a Stone and Webster subsidiary, and after four successful years returned to Boston to take charge of the budgets and operating practices of a group of such subsidiary properties scattered throughout the United States. These activities led to his concentration in the fields of rates, regulatory practices, depreciation, and accounting methods, and his experience and study formed the basis for the authoritative books from his pen. He was much sought, appearing before commissions or courts, or preparing cases in many states and in foreign countries. In 1919, he became consultant on regulation, rates, taxation, depreciation, and public relations, and in 1933 became vice-president of the Stone and Webster Engineering Corporation, in charge of all matters of appraisals and rate investigations. As the result of age and a serious illness, he was retired in 1938, but on recovery was again active in his chosen specialty as a consultant with an office in New York, although living at his old home in Ridgefield. Among other activities, he served on a special committee of the electric power industry investigating the subject of depreciation.

Nash was a frequent lecturer at M.I.T., at the Harvard Business School, and at other institutions. He was the author of three important books dealing with public utilities: *The Economics of Public Utilities*, 1925 and 1931; *Public Utility Rate Structures*, 1933; and *The Anatomy of Depreciation*, 1947. In 1896, Nash married Bonnibel Remington of Boston, who died in 1938. A son, Frank Remington Nash, died in 1913. After Nash's retirement, he was active in local organizations in Ridgefield, including the Lions Club, the Highway Safety Commission, the Congregational Church, of which he had been deacon and clerk, and the Acorn Press, Inc., of which he was president and a director. His professional societies included the American

Institute of Electrical Engineers, Edison Electric Institute, and the American Academy of Political and Social Science. He was also a member of the Chi Phi Fraternity and of several clubs in Boston and New York. His funeral was conducted by the Rev. High Shields at the Congregational church in Ridgefield and was attended by many of his former associates. Thus ended the career of a greatly respected, brilliant, and useful member of our Class. — SAMUEL C. PRESCOTT, *Secretary*, Room 3-233, M.I.T., Cambridge 39, Mass.

### 1895

In the early years of our freshman and sophomore careers, we were wont to be clannish in our class affiliations. Now, after 50 years or more of mellowing graduated experiences, we disregard the class lines and think of ourselves as part of the Alumni of the great Institute of Technology.

This was evidenced in the seating of classes at the recent June banquet of the Alumni at the Hotel Statler, where one table was shared by 12 men, including three from '95, eight from '96, and one from '97, as follows: Edwin C. Alden, Samuel P. Hunt, and Luther K. Yoder from '95; Frederick W. Damon, Robert A. Davis, James M. Driscoll, Henry G. Grush, Francis C. Hersey, Perry B. Howard, John A. Rockwell, and Conrad H. Young from '96; and Frederick L. Edmands from '97. We all had a great time.

For the past 20 years, the Class has heard little from our mate, Herbert E. Davis, IV, but recently we have learned from the *Gazette*, published in Hamilton, Bermuda, of his passing away on May 22. The item reads as follows: 'The death of Herbert E. Davis occurred at 'Seaview' on May 22, . . . He had been ill for two months and fought valiantly for recovery but the weight of his years told against him. By his passing Bermuda, and particularly Sandy's Parish, loses a dear friend who spent the years of his retirement in our midst. He was born in 1870, the only son of the late Mr. and Mrs. Stephen Davis, of Newark, New Jersey. After graduating from . . . Technology, he practiced architecture in New York City while living in Glen Ridge, N.J. He married the only daughter of Mr. and Mrs. John C. Mott, of New York City, and of this happy marriage there were two children.'

"In 1926, following his retirement from an active and successful professional career he came with Mrs. Davis to live in Bermuda. They bought the 'Seaview' where, except for a few years during the war, when restriction on travel prevented them from coming to Bermuda, they spent the greater part of their time. Until last year, they maintained a summer home in Nantucket where, as in Bermuda, they had a host of friends and were deeply loved by all who knew them.

"Upon 'Seaview' Mr. Davis exercised his architectural talents, making of the old house a beautiful home and enormously enhancing the natural beauty of the surrounding acres until today it stands as a monument to his good taste and judgment. He loved Bermuda, he loved beauty in every form, he loved people, he loved

horses and every growing thing, and he reaped his reward in the response he awakened. In Sandy's Parish he actively concerned himself with roadside planting and in the preservation of the rural amenities of his adopted home. He was buried in the little corner of St. James's Churchyard set apart for those who, like him, had adopted Bermuda as their home and had found happiness and surcease from their labors in our midst."

To reach Allison Owen, address him at Allison Owen and Associates, 1101 B, Pere Marquette Building, New Orleans, La. Walter A. Hall is still a resident of Swampscott, Mass., but at 15 Puritan Road. George G. Greene, who previously lived in Hamilton, Ontario, is now located at Shadeland Avenue, Aldershot, Ontario, Canada.

For those who have personally known Charles Tilley Brownell, IV, we make this belated record of his passing. He was a native of Newport, R.I., born in 1870, and after finishing his work at the Institute, served as architectural engineer at the torpedo station of our government in Newport from June, 1909, to August, 1916, and in the same capacity at the Naval Training Station until 1940. Called from retirement the same year, he remained until 1941. He passed away at his home, 22 Channing Street, Newport, R.I., on April 6. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

### 1896

The Secretary is happy to report that he was discharged from the M.I.T. Infirmary on July 29 and, except for a little unsteadiness in walking, which is gradually improving, he is now in much better shape than when he entered the infirmary in March. He spent three weeks in August on the old farm in New Hampshire and enjoyed the nice products of the garden and then left on September 3 for an 1,800-mile automobile trip, which he made alone to Ontario. He is now back on the job at M.I.T. as Alumni Secretary, but does no more teaching, as he is on a retired basis, having held his last class in June, 1945. One of the thrills of his hospitalization was the opportunity which he had to extend greetings to the Alumni attending the annual banquet in the Hotel Statler in Boston on June 14. This was accomplished by a telephone hookup from his room in the Infirmary to the loud-speaker system of the banquet, so that the Secretary talked directly from his bed. He desires to thank the many classmates who sent him cards and letters during his hospitalization, all of which were much enjoyed and appreciated. While in New Hampshire, he dined on Sunday, August 24, with Charlie and Bertha Tucker in North Andover, Mass., and enjoyed particularly some of Bertha's fine tomato and celery cocktail. Charlie reported that he had been elected genealogist general of the National Society of the Sons of the American Revolution at Huntington, W.Va., for a second term of one year. He and Bertha both attended the convention. Although the Secretary was not actually present at the Alumni Banquet in person, we were well represented by nine classmates, including Damon, Davis, Driscoll, Grush, Hersey, P. B. Howard, Hunt, Rockwell, and Young.

Rockwell and Damon made another fishing trip to Moosehead Lake in Maine during the latter part of June and reported fairly good luck. As on their earlier trip, Rockwell brought back a fish to the Secretary, which he enjoyed very much in the M.I.T. Infirmary. In July, Rockwell, with Mrs. Rockwell, made one of his periodical visits to Tennessee.

Sager spent about three weeks at his summer home in Maine in July, and was there again in the latter part of August and the early part of September. Mrs. Sager spent most of the summer there. The Secretary regretted that he was unable to accept a warm invitation to pay them a visit at New Meadows sometime during the summer.

John Tilley wrote that business affairs are moving along about as usual in the construction line in New York and that they had been quite busy in the office, but that lack of labor and materials is still a handicap. Walter Stearns went South, so that his address after September 15 became 211 Newbern Avenue, Raleigh, N.C. Lou Morse reports in a letter that he continues in his usual good health and finds plenty of activity at the office and around home in York, Pa., and further, that Mrs. Morse's health remains about the same.

Con Young on Cape Cod has been most faithful in corresponding with the Secretary during his hospitalization with letters on June 8, June 15, July 1, and August 13. He has apparently had a busy summer at Bass River, serving at the beck and call of his good wife, Abby, and acting as an official in the races of the Bass River Yacht Club. His physical condition continues very satisfactory, and in fact it seems that he does not have any time to be under the weather.

Paul Litchfield returned on July 10 from an extensive trip by air to Europe and Africa. He sent his complete schedule, covering the time from June 7 to July 10. He traveled altogether over 25,000 miles, and with other trips that he had made, it rounded out a total of between 50,000 and 60,000 miles that Paul had journeyed by air during the period of 12 months. The principal points of interest on his trip were visits to Goodyear distributors and meetings with many of the politicians, bankers, and businessmen in South Africa. He spent one afternoon with General Smuts, premier of South Africa, whom he considers to be one of the famous statesmen of our time. The opening of the new Goodyear factory at Port Elizabeth, South Africa, was the principal reason for making the trip. In 30 days he stopped in 20 different countries, where he had a good chance to see both living and political conditions, and this made a record of covering more territory than ever before in such a short space of time. Paul remarks that air power has shrunk the world to a small fraction of its former size, and whereas the best speed of transportation 150 years ago was about a mile in four minutes, he made on this trip an average of four miles a minute. He spent a few days in Cairo, a week in Paris as representative of our State Department at the International Rubber Study meeting the first week in July, and a short time in Belgium and Sweden. Many of us will envy Paul's ability to travel so extensively by air.

Billy Haseltine is now back home from California and is at his old address: 537 Watson Street, Ripon, Wis. — The General Electric Company has put out a press bulletin on Dr. Coolidge pointing out that he is listed in the giant 3,350-page Webster's *New International Dictionary*, Second Edition, on page 585. He is also listed in the biographical section of the dictionary, which contains more than 13,500 names of famous people of the world since the beginning of time. The bulletin points out that Dr. Coolidge's United States patents number nearly 100, including several recent patents on apparatus connected with the last war. This press release refers to him as Dr. Coolidge, and not by our more familiar designation of Will Coolidge.

Abram Garfield has made a recent change, and his architectural firm is now Garfield, Harris, Robinson and Schafer, at 1740 East 12th Street, Cleveland 14, Ohio. — Lloyd Wayne in Indianapolis came through with two condoling letters to the Secretary on June 23 and July 7. He had a persistent cold, which he was finally able to shake by making a trip to Michigan. The last word he had had from Billy Andrew was that he had retired from his business in Cincinnati and had moved to California permanently. Incidentally, Wayne reported that Andrew's address in California was Apartment 25, at 324 Larkin Street, in San Francisco. As one of the telephone company's Hoosier pioneer life members, Wayne cut the cake which was presented to him on his birthday, May 22. He was also the recipient of many birthday cards on that occasion.

Ed Sturtevant has sent the Secretary, and Bakenhus also, cards from Montana, where he was taking a vacation from his duties in Washington. Bakenhus himself still continues active in fencing at the New York Athletic Club. Recently in a friendly, informal saber bout with a friend who later won the saber championship of the United States, Reuben won, five to four, and then lost another bout with the same score. On the cover of the bill of fare of the New York Athletic Club, there is a cut of Reuben in fencing attire. He left early in September for a trip to the West Coast, to continue until October 19. His main objective was to see his sisters who live in Seattle, San Francisco, and Los Angeles. His plan was to spend three weeks resting at his sister's home on the shores of Puget Sound, and he was anticipating the enjoyment of spending most of his time sitting on the shore with the waters of the Sound lapping at his feet. He must have good stamina to stand the cold waters of Puget Sound. It was his first real vacation in many years. Incidentally, he planned to take in the Grand Canyon on his return from the Pacific Coast.

Jack Eynon is back in San Diego and apparently well recovered from his recent indisposition, which called for a sojourn in the desert. Charlie Stamp, who gave us much pleasure when he appeared at our 50th anniversary for the first time at any reunion, writes from Rancho Santa Fe in California that he had intended to take a trip East this fall, but having built a new garage and made various improvements to his house and grounds, he found that the funds available limited the outing of Mrs. Stamp and himself to a trip only to San

Francisco, but he was hoping to get East next year. He reported some trouble with the water softener in his house, which was installed in the basement so low that he had to put in a sump pump to lift the drain water during the cleansing operation about every 10 days to get the 15 gallons of salt water or brine up to the sewer level. This brine corrodes the shaft of the pump and prevents it from starting. So far he has tried shafts of brass, chrome, and aluminum, but they all stuck, and he is therefore seeking a solution to his problem.

Jacobs in Burlington, Vt., spent a week in New York City in June, and visited Lake Success, where he saw the redoubtable Gromyko in action. He found the place and occasion most interesting. The immediate cause of his trip was the meetings of the Seismological Society at Fordham. His status as state geologist of Vermont has now changed to consulting geologist, which gives him more freedom of action. He said the level of Lake Champlain had not been so high since the flood of 1927. Incidentally, he had sold his camp on the lake at considerable profit. He had found that it was quite a chore to keep it up.

Dan Bates called at the Secretary's office at M.I.T. while the Secretary was in the Brooks Hospital in Brookline for operation, so that the Secretary missed the pleasure of seeing Dan. In the middle of September, the Secretary had a call from N. A. Hill of Australia, who is coming as a graduate student to M.I.T., and who brought a letter of introduction from Rutherford. He reported that Rutherford was in excellent condition and apparently very happy and contented to be back with his people in Australia.

It is with much regret that the passing of seven members of the Class is reported. Allan Cameron, Jr., died on June 11, 1946. He was with us during our freshman year as a student in Course II and had been a mental patient at the Waverley, Mass., asylum for many years. — William B. Corson, who was with us for four years as a student in Course II, died on July 8, 1944, in Savannah, Ga. Before 1940, when he retired, he had been with various business firms, including Wanamaker and W. and J. Sloane, in New York City, and the Lindsay and Morgan Company in Savannah.

Armin F. Lindenlaub, who was with us for three years as a student in Course VI, died on January 9, 1944, in Chemnitz, Saxony, Germany. His widow, Mrs. Hedwig Lindenlaub, whose address is Friedrichplatz 3, Chemnitz (Bundesland Sachsen), Deutschland, Russian Zone, has written that her husband's death occurred after a serious illness, caused by the constant excitement and food shortage which accompanied the war, so that he finally died of exhaustion after having completed the 73d year of his life. He had been unemployed for about 10 years. The family lost all and are now poor. The daughter Tese, whose husband fell at Sevastopol, and her small son are living with Armin's widow. She writes that the food situation is very precarious, so that they are frequently without anything to eat, and packages of food sent from America will be most welcome if any classmate feels the urge to help them. They are living in the Russian zone, where it is permissible to send packages up to 20 (German) pounds in weight.

Mrs. Francis W. Lee, who as Marion Lewis was graduated with us in Architecture in 1896, died in Oklahoma City, Okla., at the home of her son, Francis L. Lee (M.I.T. '40), on July 18. She had been ill with heart trouble for some time. Her first husband was Herbert W. Chamberlain '96, who died on May 26, 1899. She married again on July 2, 1911, Francis W. Lee. During her career she had been connected with the Boston Public Library, the Columbia University Library, and the New York City Library, as well as serving as dean of women at Rhode Island State College. She had been retired for a number of years, living in Walpole and Springfield, Mass. Annie G. Molloy died on October 7, 1945. She had been a special student in Course VII for the year 1893-1894 and until her retirement was a schoolteacher in Brookline.

Francis C. Hersey passed away on September 9 at the Glover Memorial Hospital in Needham. He had been ill during the latter part of the winter with what seemed to be typical pneumonia and had returned to partial work in 10 days, against his wife's judgment, but with the permission of the family doctor. During the spring, he developed difficulty in breathing and looked badly. Aspiration of the right lung became necessary, and this was repeated several times. About 10 days before his death, he had been transferred from his home in Needham to the hospital. Death finally was rather sudden. The burial took place on Friday, September 12, from the First Parish Church in Needham, and the place was filled with characteristic New England citizens. The flower display was beautiful and in great profusion. Flowers were sent by the Class, and the Class was represented by Damon, Driscoll, Grush, Howard, Pierce, Rundlet, and Rockwell. The Secretary was absent in Canada at the time. Frank was one of the four remaining classmates holding a perfect record of attendance at all our class reunions. He had succeeded his father in the business of the Hersey Manufacturing Company in South Boston, where he held the position of treasurer at the time of his death. He was vice-president of the South Boston Savings Bank, a member of the Boston chapter of the Sons of the American Revolution, and the Nehoiden Lodge of Masons in Needham. He was a pigeon fancier and a member of the Roslindale Pigeon Club. He is survived by his widow, Edith Walker Hersey, two sons, Francis C., Jr., and Paul W., and a daughter, Helen Hope Hersey.

A last minute report from the General Electric Company says that Arthur Baldwin died suddenly on September 27, of a heart attack, in Beau Montel, Eure, France. Further details will be secured and given in the next issue. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge 39, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge 38, Mass.

1897

The observance and celebration of the 50th anniversary of the graduation of the Class of '97, for both of these terms can be applied, have now passed into history, and, to use a common yet expressive term, the combined event was a grand and glorious one from start to finish. The members

of the committee with Harry Worcester as chairman that made all the arrangements, particularly for the outing at Osterville, are surely to be congratulated on the success of their work.

On Tuesday, June 10, before leaving for the Cape, 18 members of the Class met for luncheon at the Engineers Club in Boston. Those present were Binley, Breed, Cassidy, Collins, Cowles, Currier, Daniell, DeWolf, Dougherty, Dunn, Eames, Edmonds, Hayward, Hooker, Humphreys, Ilsley, Norris, and Worcester. Special welcome was given to Charlie Dunn, who came all the way from Lock Haven, Pa., to attend his first reunion, and to Royal H. Hayward who similarly came from Kewanee, Ill. Stanley Hooker and Mrs. Hooker, who were at the Club with us, came up from Fort Lauderdale, Fla., where they have taken up their legal residence. Stanley never misses a reunion, the more credit to him.

The fellows left for the Cape by motor after luncheon. Arriving at East Bay Lodge, the scene of our 40th reunion, we found awaiting us or arriving shortly after, Ballou, Wilfred Bancroft, Clark, Irenée du Pont, Howes, Hubbard C. D., Commander and Mrs. Hunnewell, Lamb, W. D. Parker, Pratt, Shepard, Wadleigh, and Weymouth. Thirty men sat down to dinner Tuesday night. The entire evening was spent in talking over the past, from our freshman year to the present. As one of the fellows later very aptly put it, the Cape outing was one grand, high-speed talkfest. A number of packs of cards that were lying around available were not even opened. On Wednesday, Weymouth and Ted Sumner, who came later, disappeared somewhere to play golf, but no scores were turned in. Possibly they ran short of paper and pencil, or the adding machines did not register high enough to total up the scores.

Much enjoyment was derived from looking at a photograph of the '97 sophomore year football team. Some of the boys were good-looking fellows then, to be sure. The committee brought down some spare copies of the Class Book issued in 1914 with numerous photographs taken at the 1912 reunion at the Cotocheset House in Osterville, and these books were a source of much pleasure. Du Pont showed some earlier photos of members of the Class on a boat trip. The group photograph taken at the Cotocheset House showed 42 men, and a wave of sadness came over us as we saw there the well-remembered faces of many of those who had passed on.

Wednesday morning brought five more fellows—Sumner, H. F. Sawtelle, Humphreys, Jackson, and Olin, making a total of 35 who were at Osterville. The day was taken up in walks, talks, and automobile rides. In the late afternoon group photographs were taken. Wednesday evening was given up to the formal class dinner, and a most enjoyable event it was. The very capable chef of the Lodge served an excellent *filet mignon* dinner, and to show our appreciation of his efforts, we called him into the dining room to be toasted and to receive the thanks of the Class. After dinner, Harry Worcester arose and extended his greetings to those present. He then requested Wilfred Bancroft to act as master of ceremonies. Taken somewhat by surprise, Wilfred professed his inability,

and so on; but we all remembered his admirable functioning on similar occasions in our undergraduate years and prepared for an evening of rare pleasure, in which we were not disappointed.

Walter Humphreys was first called upon, being the representative of the 50-Year Class at the 1947 Class Day exercises. He referred to the successful effort of Harry Worcester in organizing the reunion and particularly to his long service as a member of the Institute Executive Committee. Jack Ilsley was then called upon and reviewed his efforts as chairman of the committee to solicit contributions to '97's 50th anniversary gift fund, to be presented to the Alumni Fund. His work was very successful, and at the Alumni Day Banquet at the Hotel Statler on Saturday, June 14, he presented to Dr. Compton a check for \$33,350, the sum total of contributions from 44 donors.

Wilfred then suggested that nominations for other speakers be made from the floor, and as a result a number of fellows gave short addresses on various topics. Among these was Irenée du Pont, who said he wished to correct a false impression relative to the number of his grandchildren. Whereas the impression was that the number was 22, we were very glad to hear from Irenée that the last census, as of June 11, showed this number to be 25. No other figures were entered in competition, but it was rumored that Harry Worcester owned up to eight grandsons. Let us know, Harry, when a granddaughter arrives, and we will celebrate.

Harry Ballou spoke enthusiastically of the work of the late Walter Spear on the New York City water supply system. It is possible that sometime in the near future a memoir of Walter Spear and his work will be issued by the American Society of Civil Engineers. Harry is doing all possible to further the project. Francis H. Shepard told of his work on the electrification of American railroads and also described some of the foreign trips made in connection with his electrical engineering work. Then, becoming serious for the moment—if you can imagine that—he said we should be more active in expressing our views in matters of public concern. Luzzerne Cowles followed in much the same vein, stressing the value of frequently writing our views to our United States senators and representatives. He censured our too frequent attitude of "what's the use?" Stanley Hooker, who is a citizen of Fort Lauderdale, Fla., described the charms of that part of the country and made us all long to go there next winter.

Charlie Eames spoke interestingly of his lifework as president of the Lowell Textile Institute, referring to that institute as a "child of M.I.T." The late President Walker and members of Technology's faculty were frequently consulted in the early days of the Lowell institution and, except for a period of one year at the beginning, the heads have all been graduates of M.I.T. It has been the aim to turn out men who would have the same point of view toward the problems of the textile industry that graduates of Technology have toward the problems of engineering. Charlie Dunn, or to be more respectful, Judge Dunn, told of his work as a judge of the juvenile court in Pennsylvania. He saw

no reason, in answer to some points raised by certain of his listeners, why his course in mechanical engineering at Technology should not be considered as an excellent training for a judgeship. All right, Charlie, as we are no longer juveniles, there is not much danger of being haled before you in court unless you charge us with being in our second childhood. In such case, we can but plead for leniency. Ted Sumner spoke briefly on the position of this country in the future of international affairs and described some of his experiences in France and Germany. John Taylor exhibited a '97 class cane about which nearly everyone present had forgotten. Your Secretary made a plea for more items for the class news columns in The Review, stating that the general impression was that '97 men never did anything worthy of mention except to retire or die. Others spoke briefly, and at a late hour the meeting adjourned with the singing of the Stein Song. A toast was given in silence in memory of those who had passed on. It was the opinion of everyone present that the meeting had been one of the best in the annals of the Class.

On Thursday morning, the men began to leave for their several destinations, all voicing their opinion that the reunion had been most successful and that East Bay Lodge, with its genial host and hostess, was an ideal place for such an event.

On Friday in the forenoon some 23 of the Class gathered in the robing room at Symphony Hall to attend the commencement exercises of the Class of 1947. Here they were fitted with caps, gowns, and hoods appropriate for B.S. degrees at M.I.T. They followed the members of the Corporation in the academic procession to the platform in Symphony Hall, where they were seated during the exercises, representing the 50-Year Class. Among those present were W. H. Allen, Ballou, Wilfred Bancroft, Binley, Breed, Buell, Collins, Cowles, Currier, Daniell, Dougherty, Dunn, Eames, Edmonds, Hayward, Hemmings, Hunnewell, Ilsley, Lunt, Shepard, J. W. Smith, Wadleigh, and Weymouth. As for a number of years past, Walter Humphreys was marshal of the Corporation.

After the commencement exercises, the members of the Class with their wives were entertained at a luncheon given by Dr. and Mrs. Compton in the Campus Room of the Graduate House. Dr. Compton extended his greetings to the 50-Year Class and called special attention to the fact that we were honored by having four life members on the Corporation, Walter Humphreys as secretary, John R. Macomber, William C. Potter, and Henry E. Worcester, who has been so generous and helpful in promoting athletics at the Institute.

Saturday was Alumni Day, with the luncheon served in Du Pont Court. Our members, in honor of being the 50-Year Class, were seated at tables in one of the recitation rooms of Building One. Among those present were Mr. and Mrs. Ballou, Wilfred Bancroft, Mr. and Mrs. Binley, Mr. and Mrs. Breed, H. A. Clark and daughter, Mr. and Mrs. Collins, Mr. and Mrs. Cowles, Mr. and Mrs. Daniell, P. L. Dougherty, W. C. Dunn, Charles H. Eames, W. W. Eaton, Mr. and Mrs. Edmonds, Mr. and Mrs. Hayward, Mr. and Mrs. Hooker, Commander and Mrs. Hunnewell,

Mr. and Mrs. Hubbard, Walter Humphreys, Mr. and Mrs. Ilsley, Mr. and Mrs. Jackson, Mr. and Mrs. Noble, Dr. and Mrs. Norris, F. H. Shepard, James W. Smith, Edward A. Sumner, John B. Taylor, Mr. and Mrs. Wadleigh, Thomas R. Weymouth, and Mr. and Mrs. Worcester. Dr. and Mrs. Compton lunched in the same room. Many of the ladies attended the garden party given later in the afternoon by Mrs. Compton at the President's House.

At the Alumni Day Banquet at the Hotel Statler on Saturday evening, 25 members of the Class were seated at the tables on the floor. Walter Humphreys and John P. Ilsley were seated at the table on the platform, the former in recognition of being the '97 speaker at the 1947 Class Day exercises and the latter as being the one to present the class gift to the President. Before the banquet the members and their wives gathered in a private room at the Statler for a social hour. Mesdames Breed, Daniell, Hayward, Hooker, Hunnewell, Jackson, Noble, Wadleigh, Worcester, and others then attended the special banquet for the ladies, later going to the Pops Concert.

Those present at the Alumni Banquet were Allen, Ballou, Bancroft, Binley, Breed, Collins, Cowles, Currier, Daniell, Dougherty, Eames, Eaton, Edmonds, Hayward, Hemmings, Hooker, Humphreys, Hunnewell, Ilsley, Noble, Norris, Shepard, Sumner, Taylor, Wadleigh, Weymouth, and Worcester. Tremendous applause greeted Jack Ilsley when he presented to Dr. Compton a check for \$33,350 in token of the Class of '97's 50th anniversary gift to the Alumni Fund, and we did indeed feel proud at the enthusiastic reception of our gift.

With the ending of the banquet the observance of our 50th anniversary passed into history. When we were at Osterville, meeting fellows whom we had not seen for 50 years, our thoughts went back to the days when we sat side by side in the recitation rooms and lecture halls or worked together in the chemical and engineering laboratories of dear old Rogers, Walker, and Engineering buildings. When on Friday and Saturday we gathered at the Institute on the Charles, it was indeed difficult to realize that this was our alma mater. How proud we felt as we wandered through the vast buildings, and often became lost too, that we were a part of this magnificent and wonderful institution of engineering and science. After his return home, our beloved Wilfred Bancroft wrote a letter to your Secretary which we think well expresses the feelings of us all: "The reunion did me a world of good — I enjoyed every minute of it from soup to nuts, and brought back some very happy memories, not only of my old classmates, but of Dr. Compton, who is one of the truly great men of this generation and the most inspiring college president in the United States, bar none. When we think of what the Institute was in our day and then try to comprehend what it is today, we realize how smart we were to choose M.I.T. for our alma mater." — JOHN A. COLLINS, JR., Secretary, 20 Quincy Street, Lawrence, Mass.

#### 1898

The Class is off to a flying start on the 50th. Lester advised, as of September 29, that he had received 55 "coming cards,"

from the following: Donald N. Alexander, Robert S. Allyn, Milan V. Ayres, Roger W. Babson, Elliott R. Barker, Arthur A. Blanchard, John S. Bleeker, Howard L. Bodwell, Martin Boyle, Ernest A. Bragg, William Brewster, Elwell R. Butterworth, Edward S. Chapin, George T. Cottle, Fred B. Dawes, Maurice F. Delano, John W. Dodd, Robert M. Draper, Daniel W. Edgerly, David C. Fenner, Simon Fleisher, Lester D. Gardner, Clarence Goldsmith, Carl S. High, Heber A. Hopkins, Ralph T. Horton, Frederic A. Jones, Harold W. Jones, Arthur S. Keene, Frederic M. Kendall, Willis L. Learned, Edmund C. Little, Edward N. Milliken, Pliny B. Morrill, Willard B. Nelson, Frank B. Perry, Henry P. Richmond, Joseph C. Riley, Ernest F. Russ, Henry F. Scott, Joseph H. Sears, Lewis J. Seidensticker, Albion W. Shaw, William R. Strickland, Mark E. Taylor, M. deKay Thompson, Rudolph Tietig, George W. Treat, Fred H. Twombly, Robert B. Wallace, John E. Warren, Edgar A. Weimer, Paul B. Wesson, William A. Wilder, Charles F. Wing, Jr. Seventeen have also written that they will bring their wives. Keep the cards coming, '98.

We were well represented on Alumni Day, 1947. Nine attended the luncheon in the Great Court, namely, Arthur and Jean Blanchard, Lester and Margaret Gardner, Ernest and Marion Russ, William E. Putnam, and Edward and Marion Chapin; nine presented themselves at the Alumni Banquet in the evening at the Hotel Statler — Barker, Blanchard, Chapin, Dawes, Gardner, High (all the way from Kansas), Putnam, Russ, and Wing; and 13, — lucky number, joined the '98 get-together in the afternoon at the Algonquin Club — Barker, Blanchard, Chapin, Dawes, Dodd, Gardner, High, Putnam, Richmond, Russ, Swasey, Treat, and Wing. In addition, 28 sent greetings.

The get-together at the Algonquin Club was due to the good offices and generous hospitality of George Treat. Again, we thank you, George. Plans for the 50th were discussed at some length, and, as you have all learned since, Lester Gardner was elected chairman. You also know how enthusiastically and efficiently Lester is tackling the job. Let us, one and all, get behind him and work wholeheartedly for the reunion. When he calls, jump through hoops, if necessary, and somehow make the grade, for, as we all know, there will be only one 50th reunion!

Now for some letters. From Charles Godbold, 200 Fernmore Street, San Fernando, Calif.: "I was much interested in the description of your walk along the Chesapeake and Ohio Canal from Cabin John to Great Falls (see 1898 class notes for April) as I have taken that same walk many times, when the canal was in operation with canal boats going each way. It was particularly interesting to see the mules with their tows pass each other going in opposite directions and without help from the driver. One pair of mules would step to one side and stop while the tow would sheer off. The other pair of mules and the tow would continue on their course without interference, crossing over the tow rope, which would be lying on the ground and on the bottom of the canal. The mules, of course, do this trick so much they don't need any help.

"You passed the New Model Basin as you said, but I am sorry to say, I never was privileged to work there. My locale was at the Bureau of Ships in Washington, but I made frequent visits to the Model Basin on business and would get in contact with our old classmate, L. F. Hewins, who joined the Model Basin staff soon after graduation, when the first model basin was started at the Washington Navy Yard. He grew up with the Model Basin, but let him tell you about it.

"I should like to say at this time that the Institute has been very fortunate in getting the services of its present head of the Department of Naval Architecture. I refer, of course, to Admiral Cochrane '20. I had been associated with him for many years at the Bureau of Ships and its predecessor, the Bureau of Construction and Repair, and I know whereof I speak. He has an alert, active, and brilliant mind, one that can cope with any situation. I learned a lot, being in contact with him, and students privileged to study under his direction and guidance will have a great opportunity for learning. He knows all the answers, and in addition, he is a man we could always talk with." Thanks, Charles, for the letter. We have written to Hewins. Curious about that impressive Model Basin building. — Van Rensselaer Lansing, 500 Fifth Avenue, New York City, writes as follows: "I have been reading the various notes in The Review regarding the Class of '98, and I thought I would send in a brief summary of my activities, in case some of the '98 men may care to know that I am still on the carpet. Although I studied Electrical Engineering at the Institute and was active especially in the field of illumination for about 22 years, I later got by accident into refining, metallurgy and mining. First, I had charge of the York Metals and Alloys Company plant for about 10 years, and when that merged with the Molybdenum Corporation of America in 1929, I joined its force as vice-president and have been with them ever since. My work has been extremely varied but mostly concerned with our mining interests out West, and during the war I kept an apartment in Washington and looked after the company's interests there. At the beginning of 1946, I was duly retired, but with the proviso that I should still be allowed to continue active work, as my work is my hobby. So far this year I have made one trip out West covering about 17,000 miles, and I am just now starting off on another trip, which will be at least 10,000 miles. This sort of thing, together with looking after the company's affairs in Washington, keeps me from being too idle. Mrs. Lansing and I have been married 47 years (I met her while I was at Technology), and both of us are planning to attend the 50th reunion next year in Boston." Thanks, Van, for the letter. We have always appreciated highly your ready response to various appeals, and your splendid initiative. See you and the wife at the 50th.

Bob Wallace dropped in for a visit last June the week before Alumni Day. He was en route from Ohio to Maine and was, as usual, interested in '98 affairs and especially the 50th. Bob has made it a practice for some years to pay us a call on his trips to and from Maine, and we had missed him last fall. Well, the answer is that he was

laid up last fall and winter, but he is back in circulation again in good health, with a few restrictions prescribed by the M.D. Bob made his usually cogent suggestions for the 50th. Thanks, Bob, for the most enjoyable visit.

L. J. Seidensticker, en route from New York to Montreal, called up in the summer, and we had another delightful luncheon and talk at his hotel, all too short, as your Secretary was leaving on a trip that day. We discussed '98 and M.I.T. affairs and also the economic situation. Thanks, Seide, for stopping and next time send an advance notice, if possible.

Our illustrious classmate, Lester Gardner, is the recipient of another signal honor, the award of the Guggenheim Medal. This is described in the following clipping from the New York *Herald Tribune* of June 23: "The 1947 Daniel Guggenheim Medal for notable achievements in the advancement of aeronautics has been awarded to Lester Durand Gardner, founder of the Institute of the Aeronautical Sciences, 2 East Sixty-fourth Street, and former chairman of the institute's council, . . .

"The citation, released by the Daniel Guggenheim Medal Board of Award, named Mr. Gardner for his 'outstanding achievement in advancing aeronautics, particularly for his conception and organization of the Institute of the Aeronautical Sciences,' aviation's foremost scientific organization.

"Mr. Gardner, seventy, lives at 251 West 101st Street. He led in the organization of the institute, which was begun in 1932, retiring this year as chairman of its council and as president of the Aeronautical Archives, a division of the institute, which he also founded.

"The award board includes representatives of the institute, the American Society of Mechanical Engineers, the Society of Automotive Engineers and previous winners of the medal. Among previous winners are Orville Wright, Donald W. Douglas, Glenn L. Martin, James H. Doolittle and Theodore P. Wright.

"Mr. Gardner has received many high awards and honors for his work in aviation. He was president of Aeronautical Industries, Inc., in 1928 and president of the Aeronautical Chamber of Commerce of America in the same year.

"From 1916 to 1927 he was president of the Gardner Publishing Company, which started the publications 'Aviation,' described as the country's oldest aeronautical publication, and 'Rubber Age.' As publisher of 'Aviation,' according to the Guggenheim statement, he 'made valuable contributions to the scientific development of aeronautics and set high standards for the aeronautical profession.' He had previously been a staff member of several newspapers in New York, including 'The New York Times,' 'The Sun' and 'The New York Mail.'

"Mr. Gardner was an Army flyer in World War I, attaining the rank of major, and organized eighty-nine aviation squadrons for overseas duty while stationed at Kelly Field, Texas.

"He was born in New York City. In 1898 he received a bachelor of science degree from . . . Technology, and passed the next year at graduate studies at Columbia University.

"Mr. Gardner was on several aviation commissions and was appointed in 1927 as a delegate to the Fourth International Civil Aviation Congress in Rome. He was selected by the late President Calvin Coolidge as United States delegate to the International Conference on Civil Aeronautics in Washington in 1928.

"Mr. Gardner in 1942 became the third American to become an honorary fellow of the Royal Aeronautical Society of Great Britain. He received an honorary degree of doctor of laws from the Brooklyn Polytechnic Institute in 1944."

The New York *Times* printed the following additional information: "He was one of the organizers of the institute in 1932 and served as executive director until his retirement last year. Under his leadership the institute became the leading center for aeronautical engineers and the largest repository of aeronautical archives and mementos in the United States. He procured the Guggenheim estate near Port Washington as a study center for the organization, headquarters in the former Berwind mansion at Fifth Avenue and Sixty-fourth Street, and an endowment of \$1,800,000."

The New York *Times*, furthermore, commented editorially as follows: "Over the years the board of award of the Daniel Guggenheim Medal, generally considered the highest American Aeronautical honor, has shown good judgment in the selection of the recipients. This year it has maintained this reputation by choosing for the 1947 award Lester Durand Gardner. . . . This is proper recognition of a long and tireless effort on behalf of flying, and especially of fifteen years of whole-hearted devotion to the Institute, which has become a leader among scientific societies. The new Guggenheim medalist joins a distinguished company, the first of whom was Orville Wright in 1929 and the most recent prior recipient Frank Whittle, for pioneering the development of turbo-jet propulsion of aircraft. In between are such shining names in aeronautics as Cierva, Hun-saker, Durand and Doolittle. We are sure that Major Gardner will especially cherish this new honor because it is a tangible recognition of his creation of the Institute."

Well, Lester, major, doctor, medalist, and so on, superlatives just fail us! Most astonishing of all, you are still approachable and one of '98's boys. One of the '98 girls, Dr. A. W. Tallant of Philadelphia, has written us an exceedingly interesting letter. I am saving this for the December notes. Many thanks, Dr. Tallant.

May I conclude this first installment of notes for our Jubilee Year with the reminder that your Secretary is no mind reader. So open up the typewriter or take out the fountain pen, and just tell Uncle and the Class. Thanks! — EDWARD S. CHAPIN, *Secretary*, 463 Commercial Street, Boston 13, Mass.

#### 1899

Sherrill, Ellery, Arthur Brown, Withnell, and Rickards — these are the names of the Old Guard who attended the class luncheon on the campus on June 14 and the Alumni Dinner in the evening, and these also are the faithful classmates who have represented the Class at other recent reunions. As there are a good many members

of the Class living within the confines of Greater Boston, it is hoped that in the future others also will avail themselves of this opportunity to meet with their associates of yesteryear. Skinner, who usually attends, was away at a business convention. Rickards also attended the dinner to honorary secretaries given by President Compton on June 13.

It was with deep regret that your Secretary read the following story in the Boston *Herald* for June 12: "News has been received of the death in Madison, Wis., of Prof. James H. Walton, 68, eminent scientist, author and member of the chemistry department of the University of Wisconsin. A former resident of Newburyport, he was called to Europe by General Pershing in World War I because of his knowledge of chemical warfare. After graduating in 1895 from Newburyport High School, where one of his teachers was the late Chief Justice of the United States, Harlan F. Stone, he was graduated from . . . Technology, where he received a teaching fellowship, and later was sent to the University of Heidelberg, where he received his Ph.D. degree. He taught chemistry at Technology and the University of Illinois before going to Wisconsin."

Brainerd Taylor, formerly of Stamford, Conn., may now be addressed at 475 Chauncy Street, Mansfield, Mass. Christine H. Garrett, IV, formerly of 214 Beacon Street, Boston, is now at Bardwell Court, 38 St. Margaret's Road, Oxford, England.

Since we reported the death of Frederick Sites in the July issue of The Review, the following quotation from a letter written by a vice-president of the United States Steel Corporation has been obtained: "During the many years of association with Fred in United States Steel, I placed a high value upon the personal friendship we developed and maintained beyond the normal relationships of business. You would take pride in the remarks I have heard recently in various quarters of our organization, and I must say for myself that I have never known a man of finer qualities than those consistently displayed by Fred. It was a comfort to know such a person lived — a fine example to us all." — BURT R. RICKARDS, *Secretary*, 381 State Street, Albany, N.Y. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston 9, Mass.

#### 1900

Those attending the Alumni Banquet on June 14 were Fitch, Jackson, Neall, Pickersgill, Silverman, Smith, Ziegler, and the Secretary.

The Grim Reaper has taken quite a wide swath through our diminishing numbers since the last recording, and it is with regret that we report the following losses: Edwin W. Hammond, I, died on January 29. A delayed notice from his wife reports the death of Brackley A. Shaw of Montreal on December 22. Another belated notice came to us from the Register, noting the death on September 7, 1945, of Lewis M. Lawrence, IV, of Melrose.

The New York *Herald Tribune* published the following item: "Cyrus Howard Hapgood, sixty-six, consulting engineer for the De Laval Separator Company, dairy equipment firm at 165 Broadway, New York, died [on July 12] in Greenwich [Conn.] Hospital. Mr. Hapgood lived in

Lake Worth, Fla., and had been visiting a son, Cyrus S. Hapgood, of Riverside. Mr. Hapgood was born in Everett, Mass., and was a graduate of . . . Technology. Before joining the De Laval company in 1919, he was engineer for the United Shoe Machinery Company, Beverly, Mass., and the De Laval Steam Turbine Company, Trenton, N.J. Surviving, besides his son, are his wife, Mrs. Edith I. Hapgood; two daughters, Mrs. James E. Heap, Jr., of Moorestown, N.J., and Mrs. Anthony Kissling, of Chappaqua, N.Y., a brother, Charles W. Hapgood; and a sister, Mrs. Charles Mead, both of Fitzwilliam, N.H."

Richard C. DeWolf of Washington, D.C., died on March 8. DeWolf is well remembered for the good time he had at our last reunion, when he began to enjoy himself on retirement from the copyright department of the Library of Congress. — We regret to record the death of Mrs. Crowell, wife of Louis Crowell, on the 22d of last July. She will be well remembered as furnishing us with entertainment and good cheer at all our outings on the Cape. Fitch called on Louis a little later in the summer and reported him much improved.

The bulletin of the Youngstown Sheet and Tube Company for May carried a photograph and obituary of Emil Frederick Vogel, an employee of that company for 30 years. In ill health for some time, he died in the Youngstown Hospital on April 8. Born on February 8, 1879, a native of Roxbury, Mass., he was graduated from the Mechanic Arts High School of Boston and with us from Technology. His first position was with the Boston city engineering department. Later, he was a draftsman, and then a construction engineer, with the Lackawanna Steel Company. During his service with the Youngstown company, he was assistant superintendent, and later superintendent, of the Campbell Coke Plant, was in the industrial relations department for a while, and was superintendent at the Brier Hill Coke Plant. He was one of the founders and the second president of the Eastern States Blast Furnace and Coke Association. He was a past president of the Girard Kiwanis Club and a member of numerous Masonic lodges in Lebanon and Youngstown, Pa., Buffalo, and Cleveland. Besides his wife, Mrs. Grace Krehl Vogel, and a son, Frederick, at the home in Girard, Mr. Vogel leaves three sisters, Mrs. Josephine Lovell and Mrs. Alexander Bender of Belmont, Mass., and Mrs. Leonard Ough of Roxbury, Mass.

Dick Wastcoat wrote as follows: "We now have an elevator in the house, as I am forbidden to climb stairs. This afternoon I spent three hours on the front veranda for the first time since June 3, 1946. I still have the nurses, three of them, to watch over me. Remember me to the gang. We are on our way, getting better and better every day." — Mr. and Mrs. Charles Edward Smith announced the marriage of their daughter, Elizabeth Elsie, to Robert Ewing on Saturday, May 24, in New Haven, Conn.

From Harry Morris came word of a trip: "Early in May, three weeks after we had returned from wintering in Florida, Mrs. Morris and I 'entrained' for the Far West and shipped the car to the coast. I dropped off the train at Kingman, Ariz., where my 'buddie' and classmate, Dan Johnson, whom I had not seen in 10 years, met me

with his desert-wise Chrysler. We went to Hoover Dam, Lake Mead, which is 80 feet below the spillway, Boulder City — a green oasis in a grim desert — Las Vegas and the 'Helldorado,' Zion and Bryce canyons, Death Valley Junction, Scotty's Castle, Goldfield (one of my old camps), and Tonopah, where Dan and I arrived in a stagecoach in 1902. That was some trip — a thousand miles of desert road and from 9,100 feet above, at Bryce, to 280 feet below, sea level in the 'bottom' of Death Valley, and from ice-cold to burning hot. Since arriving here, we have been, with our bedrolls and food, to camps where the coyotes howled and wild horses and 'jacks' roamed. It has been a real experience for a 71 year old softy from Washington; but I've survived and shall probably find southern California too easy — maybe? The Morrisons hope to spend the next two or three months motoring up and down the coast country, then to dispose of the car and return to 'Vetoville,' D.C."

Ziegler met Sperry this summer in Maine and later, on a western trip, spent some time in Pittsburgh with Seaver, who has retired from the Refractories Company there. Draper called in recently and reported good health. Russell sounded much improved over the telephone; Leary, very busy; Burns, still talking politics; Bugbee, hard at work on his camp on the Cape; Stearns, visiting in Canada after his retirement from the Boston Transit Department in June.

The Boston *Herald* of May 30 carried the following notice, with a photograph of our Wilbur: "Wilbur W. Davis, 70, of 53 Ferdinand Street, Melrose Highlands, chief engineer of the Boston Transit Department and one of the country's foremost authorities on the construction of tunnels and subways, was among 20 city employees retired yesterday. Davis, a graduate of . . . Technology, class of 1900 and member of the transit department's engineering force 45 years, participated in the planning and designing of every Boston subway since the original Tremont street subway was opened in 1897. He recently completed the plans and specifications for a proposed second traffic tunnel to East Boston, and for a rapid transit extension of the elevated system to Orient Heights, East Boston." — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston 9, Mass.

## 1902

The reunion at Osterville began unofficially on Wednesday, June 11, when the New York contingent, Robbie, Jack Fruit, Vatter, and Les Hammond, came in by motor, driven by the owner, Les, but guided by scout Robinson, who knew the trail best. Immediately upon their arrival, they took over the ground floor of the annex and were well prepared to meet the Thursday arrivals.

Lew Moore started from Boston with Haskell, Collier, and your Secretary; but by good fortune, chancing to stop at the West Barnstable station to pick up any '02 men coming down on the first train from Boston, found Annett and Manning. They had come over by bus from the New York night train, which had brought them to Providence. Lew got us all down to East Bay Lodge as the earliest arrivals of the day.

By lunchtime others had arrived, and in the afternoon still more came in, and by dinnertime most of the men were on hand. Bill Bassett brought Dan Patch and Grant Taylor, while Friend, Reynolds, and Galaher each came down on his own. Bill Kellogg, Charlie Mixter, and Lowe came together, and Pember brought his old running mate, Fred Hunter. Steve Gardner journeyed up by train, Ed Nelson drove up from Pawtucket, and Fitz Gerald came from Chicago by plane to Boston and then by train down to Osterville.

Twenty-five of us sat down for the evening meal, and all seemed to be in good appetite, judging by the way the food disappeared. The Class of 1897 was likewise in health, and the dining room was one large Technology gathering. In the evening Bill Kellogg got the Class together in the large parlor, and a formal class meeting was held, with reports from Les Millar, our President, who unfortunately could not be present, from Robbie as treasurer, and from your Secretary. Letters and messages were read from many members of the Class who were unable to be present, and Dan Patch reported as class agent for the Alumni Fund. The election of officers for the next five years then came up, and all those then holding office were unanimously re-elected. These formalities over, the gathering broke up into small groups for chats, bridge, and so on.

Friday was another day of the same good weather, and the main activities were as the day before — eating three square meals, a little bathing, a little tramping, golf, and croquet, and some local sight-seeing drives. In the evening Dan Patch gave us a treat of two films, showing the sugar plantations and native flowers of Hawaii and local scenes around his summer home in Friendship, Maine.

On Saturday, the weather failed to maintain its good record, but those who had intended to take in the Cambridge exercises made Boston before the rains came — which they did while the alumni luncheon was under way. We managed to get a good luncheon, however, and were grouped together for the most part. Here we picked up Cates and Dana Fisher. Dana's son, Robert, had been graduated the day before, which accounted for Dana's absence from Osterville, and Fitz Gerald's nephew had drawn Fitz from the crowd on Friday. After luncheon the gathering of '02 split up, some attending the official Symposium, and others an informal affair around the pillars of the main entrance, in which the topics discussed ranged from universal military training to the peculiar idioms of the Spanish language.

At the Alumni Banquet we were joined by Cates, Proctor, Bourneuf, and Mahar, filling up one table and filtering into two other class groups. Our number here was 18, as several of those in attendance at Osterville had remained on the Cape for a longer vacation or had been obliged to shorten their absence from home. All those who were at the banquet should by this time have received from Cates a useful and hardy implement for opening beer bottles at future banquets, these souvenirs being the same as were given out by the Phelps-Dodge Corporation at the 75th anniversary of the founding of the American Institute of Mining and Metallurgical Engineers.

As might be expected, much news about members of the Class has come to light in the course of reunion correspondence. Frank Robbins was unable to come because of entrance into the public service of Pennsylvania. On January 15, he was named to head the Department of Public Assistance. We quote an editorial from the Harrisburg *News*: "When Frank A. Robbins retired in June of last year from the general management of the Steelton plant of Bethlehem Steel, this column expressed the hope that in some fashion his abilities and civic talents would not retire with him. Governor-elect Duff's appointment of Mr. Robbins as his Secretary of Public Assistance is a realization of that hope, a satisfaction shared by many persons. Bringing to his Cabinet portfolio years upon years of activity with community chests, hospital management, direction of public assistance administration, Mr. Robbins seems to be designed with exact precision for the public duties he will be called upon to perform. That his performance will be an able and conscientious one may be taken for granted. He has never been content as just plain 'window dressing.' As Secretary of Public Assistance he will do no less."

From a clipping sent in by Dougherty '97, we learn that Robert Mayo, Jr., who has been chief mechanical engineer in the office of the supervising architect of the Public Buildings Administration in Washington, D.C., retired in June, having reached the statutory retirement age. — Word has been received from the Alumni Office of the death of two other classmates: Leroy E. Kern on March 12, and of Archibald Gardner on January 24.

Recently on a trip into New Hampshire, Mrs. Philbrick and I called at the home of Arthur Hall in Chocorua. Unfortunately Arthur was away on business, but we had a delightful hour with Mrs. Hall. The Halls are very pleasantly located on the main highway in the center of the town. — BURTON G. PHILBRICK, *Secretary*, 246 Stuart Street, Boston 16, Mass.

### 1903

An interesting letter and a May copy of "Fasteners," a trade paper published by the American Institute of Bolt, Nut and Rivet Manufacturers, was received from E. H. Millard too late for our last issue. Millard is works manager and director of the Fort Pitt Bridge Works, in Canonsburg, Pa., and has written for "Fasteners," an article "more historical, than technical," he says, concerning cold riveting, a subject which is interesting particularly to the structural engineer. His picture at the head of the article looks natural. We were glad to hear from him. Several of the Class were present for the Alumni Day celebrations on June 14, or some part of them.

On June 30, Howard S. Denham, VI, died at his home in Malden. He was a heating and ventilating engineer, working for Stone and Webster during the war, and for his work received a citation in connection with the atomic bomb. He was a member of the Republican City Committee of Malden and the American Society of Heating and Ventilating Engineers. He leaves a wife and a daughter. He was very regular in his attendance at Alumni affairs and will be missed.

From the Alumni Office we received notice of the death of Herbert M. Bacon, V, VI, in West Hartford, Conn., on March 19. Also reported is the death of Howard Breed, IX, in Cincinnati, Ohio, on June 29. He had been president since 1924 of the Crane and Breed Casket Company. Breed's early education was in Munich, Germany, at the American Academy; and later he studied in England and Switzerland. He was graduated with us in Course IX and joined the firm which his grandfather had taken over in 1853. The company was one of the first major industries in Cincinnati; it is the largest casket company operating under one roof, as well as the oldest firm of its kind, in the United States. We are indebted to the Cincinnati *Times-Star* for the above information. He leaves only his widow.

We have received a number of changes of address lately, possibly indicating retirements. The Secretaries would be glad to hear from retired members concerning their future plans. — During the summer, from August 25 to August 29, the University of Connecticut carried on a Labor-Management Institute, under the direction of Myron H. Clark, V. "Short courses, seminars, and conferences open to employers, employees, and other interested citizens were planned, and certificates were issued to those attending." — FREDERIC A. EUSTIS, *Secretary*, 131 State Street, Boston 9, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, 441 Stuart Street, Boston 16, Mass.

### 1904

These are the first class notes since the alumni reunion in June, and although that seems a long time ago, it should be stated for the record that ten '04 men were present, viz.: Anderson, Fellows, Galusha, Hayward, Hiller, Munster, Parker, Roberts, Russell, and Wilson. It was agreed that the undersigned should continue to do the work of Secretary Stevens while he is incapacitated, and we will try our best to do so, although we probably can't approach Steve's efficiency, and we lack his wide acquaintance among the class membership. Won't you all help us out by providing some class news and suggesting what you would like for a reunion next June?

A few items of news have come to our attention. First, another retirement, this time that of E. A. Holbrook, III, who has been for many years dean of the schools of engineering and mines at the University of Pittsburgh. He is retiring because of ill health. A brief summary of his career runs as follows: After graduation from high school in 1898 (in Fitchburg, Mass., where he was born on June 23, 1881), he went West, but after two years of mining work returned to his home state to enter M.I.T., from which he was graduated in 1904. For the next six years, Dean Holbrook was active in the metal mining industry in the West and then went to Nova Scotia to be an engineer in the coal fields. After a few years of lecturing at the Nova Scotia Technical School, he joined the faculty at the University of Illinois as associate professor of mining, later becoming professor of mineral preparation. In 1917, Dean Holbrook began his association with the Bureau of Mines, serving successively as supervising mining engineer and metallurgical investigator in the central coal

fields, acting chief mining engineer at Washington, D.C., superintendent of the Pittsburgh research station, and assistant director of mines, Washington, D.C. In 1927, having served four years as dean of the school of mines and metallurgy at Pennsylvania State College, Dean Holbrook was appointed dean of the schools of engineering and mines at Pittsburgh University.

The next item is a promotion, as may be seen from the following quotation from the *New York Times*: "Percy Alexander Staples, who says he is 'just a New England Yankee taking things in stride,' . . . took over the presidency of the Hershey Chocolate Corporation, succeeding William F. R. Murrie. Mr. Staples, a member of the board since 1927, also was made chairman of the board of directors in the company's annual reorganization meeting yesterday. The 63-year-old new Hershey president, who was left an orphan at 12, moved up to the presidency from head of the Hershey Trust Company, trustee for the vast Hershey enterprises, including the philanthropy for the Hershey Industrial School for Boys. Mr. Staples, graduate of . . . Technology, joined the chocolate organization twenty-six years ago and was named controller of the company's Cuban interests. As general manager, he rebuilt and reorganized six of Hershey's sugar and public utility properties in Cuba to a point where they produced more than three times Hershey's requirements for sugar in chocolate making. As president of the Cuban companies, a position to which he was named in 1927, he built Central Hershey, the Cuban counterpart of the town of Hershey, Pennsylvania. He was born in Portland, Maine, on March 31, 1883." Congratulations, Percy!

Gus Munster gets down to Prouts Neck, Maine, now and then and on a recent trip ran across Charlie Homer, the popular President of '04 during our undergraduate days. As stated in a recent edition of the class notes, Charlie has remarried and is living in Scarborough, where, between putting on art exhibits and keeping the natives in line, he is as busy as we always remembered him to be. He runs affairs at Prouts Neck with an iron hand.

Walter Hadley, III, recently retired from the Carnegie-Illinois Steel Corporation and is now reported as living in Newtown, Conn. Arthur Willard, who has distinguished himself in academic fields, has again appeared in the news, as shown by an item in the Portland, Maine, *Press-Herald*, which stated that Dr. Willard, President Emeritus of the University of Illinois, was to be the commencement speaker at the University of Maine in June. It went on to say, "Dr. Willard joined the faculty at the University of Illinois in 1913 as assistant professor of heating and ventilation. Four years later he was named a full professor, and in 1920 became head of the department of mechanical engineering. He served as acting dean of the College of Engineering and director of the Engineering Experiment Station in 1933-34, and was named president of the university in 1934. Born in Washington, D.C., he was graduated from M.I.T. in 1904 with an S.B. degree in chemical engineering. Later he received LL.D. degrees from Northwestern University and George Washing-

ton University, and a Doctor of Engineering degree from the Case School of Applied Science. Before going to the University of Illinois, he was on the faculty of the California School of Mechanic Arts and George Washington University. He has served as a consultant on many large construction projects. He is a member of several honorary engineering societies and the author of a number of books and articles. Dr. Willard has spent his summers in Farmington for several years."

Cy Ferris has come through with an interesting item of family news. His son John (M.I.T. '39) was married in Milwaukee on June 7 to Claire Fleming, and another son Cy, Jr. (M.I.T. '47), was married in New York on July 19 to Barbara Agapeyeff. — Jack Draper will soon be flitting to Florida to spend a hard winter at hunting, fishing, and such nerve-wracking pursuits. You have our sympathy, Jack. It's surely a tough life.

It is not pleasant to turn from weddings to deaths but the collection of data for the forthcoming Alumni Register has brought news of several losses from our Class, as follows: Willard D. Chandler, on February 27, 1946; Ernest W. Calkins, Jr., on March 30, 1947; Victor H. Elsas, on April 17, 1947; Grant Ford, on April 29, 1947; William McEntee, on September 7, 1946; and George C. Richards, on May 2, 1947. No details are available except for Richards. His home was in Andover, but he had been visiting his son in Sanford, Maine, where he died at the Goodall Hospital. He is survived by two sons and two daughters. — EUGENE H. RUSSELL, JR., 82 Devonshire Street, Boston, Mass. CARLE R. HAYWARD, M.I.T., Room 8-109, Cambridge 39, Mass.

## 1905

Your Secretary has to plead guilty of negligence in connection with notes for the two issues just prior to the summer vacation period. Five pages of notes were prepared for the May issue, presumably sent to the editor, but found in the files months later, apparently filed by my secretary by mistake. Since much of this copy is now stale, the first section herewith will be an attempt at condensation of these notes.

First we announced further laurels for our own Doc, Professor Warren K. Lewis, X. Frankly, Doc has received so many of these maximums that we can't keep up with them — the Perkin Medal for 1936, the Priestley Medal and the Lamme Medal, both this year, and in April the honorary degree of doctor of engineering from Princeton University. The citation contains a lot of 64-dollar words, but it is one more bit of testimony to Doc's value to mankind.

Walter Bent, X, finally settled in retirement in his country home at Old Lyme, Conn., says that although he lost 30 pounds (physically) in England during the war, now that he has been able "to get enough to eat over here," he has gained it all back and some more. Bill Spalding writes from Fort Worth, Texas, that life is still very strenuous at American Cyanamid there. A cold wave in January froze their steam boiler and gas line, then the C.I.O. landed a strike on his neck, causing Bill to ask, "What was it we learned at Tech about victory going to him that sweateth in the arena?" Bill has qualified for the Grandfather Club via his daughter. Later,

we received proof through a snapshot showing Bill with granddaughter and her father. Bill's two sons were back from the war; both have married.

Herb Kenway writes as follows: "On November 21, my third grandson, John P. Hayden, was born in Orono, Maine, to my daughter Margaret and her husband, Colonel F. S. Hayden, O.B.E. (Order of the British Empire for hot work in Africa). At its annual meeting I was elected president of the Boston Patent Law Association for 1947. Paul Blair died some time in December." Through A. M. Holcombe '04, we have this obituary: "Paul A. Blair was born in Waterbury, Conn., on April 16, 1884, and died in Washington, D. C., on December 22. He attended Technology with the class of 1905. After securing a legal education at the National University law school in Washington, he was admitted to the District of Columbia bar in 1907; he practiced patent law in New York City with Duell, Warfield, and Duell and in Washington with Browne and Phelps before organizing his own firm.

During World War I, Blair was in the Bureau of Ordnance of the Navy Department, engaged in patent work, and after that resumed private practice in Washington, where he served as expert for the government in patent suits. He organized the firm of Blair and Kilcoyne in 1924 and practiced under this name until 1942, when, together with A. M. Holcombe '04, he organized the patent law firm of Emery, Holcombe and Blair and continued a member of this firm until his death after an illness of several months. He enjoyed a good reputation for his ability to handle technical inventions in a wide variety of fields, embracing chemical and electrical as well as ordnance and other military inventions. Many of his clients were from abroad, particularly Great Britain, and he made two trips to Europe in connection with this work, taking his wife with him on one of these trips. He is survived by his wife, Ruth Browne Blair, and a son, Alexander Browne Blair."

Roy H. Allen, III, left for Nicaro, Oriente, Cuba, for several weeks' assignment as senior engineer with the Office of Defense Plants. — The last time I saw Harry Donald, he told me he was to retire on pension from the American Mutual Liability Insurance Company.

One of the saddest things I have had to write during my tenure as secretary is with regard to Bill Motter, III. In January, I had a copy of a letter of encouragement Bill had written to Harry Wentworth, in which Bill wrote, "Thrombosis hit me on November 9, and Goldy's letter telling me about your condition came on December 16, the day after I had returned from the hospital, . . . I was very sorry to hear of your misfortune and only hope your recovery has been as rapid as mine." Unfortunately, Bill's confidence in his own recovery was not well founded, for he died at his home in Greenwich, Conn., on March 18. Bill was president of our Class in our senior year, and in spite of the fact that no president has been elected since graduation, we have always looked at (and up to) Bill as presxy. His genial smile, his jovial spirit, his sound judgment will be missed at future reunions, but it is nice to have known and held communion with one of

the world's best. On finding notice of his death in the *Boston Herald*, I called Percy Hill in New York and asked him to arrange for flowers for the funeral, only to learn that the family had requested that flowers be omitted. A letter of condolence and an attempt to convey the collective sympathy of the Class has been sent to Mrs. Motter and family. The following obituary is from a New York paper of March 20.

"William D. B. Motter, Jr., 63, mining engineer and assistant to the vice president of the Chile Exploration Company, at 25 Broadway, New York, died here [on March 18] at his home in North Maple Avenue. Mr. Motter was a vice-president of the Mining and Metallurgical Society of America and a past president of the Mining Club of New York. After his graduation in 1905 from . . . Technology, he worked in South America and Canada. Mr. Motter was born in St. Joseph, Mo., the son of the late William D. B. and Elizabeth Inslee Motter. From 1905 to 1907 he was a mine superintendent in Mexico, later at the Orogande Smelting Company in Orogande, N. M., and in 1911 he became manager of the Canadian Iron Mines, Ltd., in Ontario. Three years later he was appointed manager of the Benson Mine Company at Benson Mine, N.Y. In 1923, Mr. Motter joined the Chile Exploration Company. At the same time, he became a director of the Chile Steamship Company. Both concerns are subsidiaries of the Anaconda Copper Mining Company. Mr. Motter was chairman of the special committee on ways and means of the American Institute of Mining and Metallurgical Engineers. He also belonged to the Technology Club, Delta Upsilon Fraternity, the Campfire Club of America, the Cos Cob, Conn., Revolver and Rifle Club and the Greenwich Country Club. His wife, Mrs. Elsie Catlin Motter, a daughter, Miss Joan Catlin Motter, and a sister, Miss Ellen I. Motter, of New York City, survive."

Harry Wentworth's condition was so improved that in February he went to Florida for further rest and recuperation, returning at the end of a month somewhat improved. Harry has his chin up and is fighting to make a complete comeback and hopes to be back at his regular haunts next September. We're pulling for you 100 per cent, Harry.

Grafton Perkins brings us up to date as follows: "Maybe I have told you before that I retired last summer as vice-president and advertising manager of Lever Brothers Company. After a summer of rustication, I got the itch to get back into light harness and set myself up as advertising and marketing counsel (advt.). I have not been pressing the matter too hard but already have a couple of very interesting clients. One or two more, and I shall have all I want to do. I find it far more interesting than the prospect of collecting antique whiskey bottles or growing roses. Family-wise, several changes. There have been no added grandchildren, but I have acquired a new son-in-law, my daughter, Anne Dudley, having married Davis R. Dewey, 2d, '41, son of Bradley Dewey '90 of the M.I.T. Corporation and other things. The wedding was on February 8. Grafton, Jr., ('36) is still with the Pepsi-Cola Company at Long Island City, in special sales work.

No. 2 boy, Robert, is back after two years in the China-Burma-India theater with the Army. He spent most of this time with the Office of Strategic Services in China and is moving heaven and earth to line up a job which will take him back (advt.). It was gratifying to have one big contributor kick through again this year to save the Class from an otherwise undistinguished record in the Alumni Fund collection. Perhaps I should have mentioned earlier that Papa and Mama Perkins are enjoying their usual good health, to say nothing of vim and vigor beyond the deserts of their maturing years. But happily we are used to that state — I knock on wood vigorously — and so it slipped my mind. Thus anyone who has been worrying about us up to this point may relax."

After many years, we succeeded in getting a "rise" out of Bob Gardner, thanks to Mrs. Bob's urging. He says, "we came out to the West Coast in 1923 when Merritt-Chapman and Scott opened an office in San Pedro. I served with them in charge of Marine Salvage until 1932, a period during which we had a number of successful salvage jobs up and down the coast and one in the South Pacific. After leaving M. C. and S., I opened an office of my own as a consultant in marine salvage and studio work, while carrying on a manufacturers' agency. In the spring of 1940, I acted as Lloyd's representative on the S.S. *Timber Rush*, stranded below Acapulco, Mexico; and when the ship was abandoned as a total loss, I remained on the job for M. C. and S. to assist in salvaging the cargo and transporting it to the States. Like many such ventures in that country, we had no end of trouble with the Mexican Government getting the cargo out of that country after it had been salved and stored in government warehouses. The first man I met when I alighted from the plane in Acapulco was from the American Consulate, one Robert Sherman MacGregor. I thought it strange that his first and middle name should be the same as mine, but when I learned that his wife's maiden name was Marcy and that she came from Boston, I was even more surprised. To think that I should go to Mexico City and meet Grove Marcy's daughter, married to a Robert Sherman MacGregor was quite remarkable.

"In the fall of 1941, the Merritt-Chapman and Scott Corporation entered into a contract with the Navy Department Buships to maintain salvage facilities on both coasts for the protection of government-owned vessels, using Navy-owned vessels and gear, manned by civilians. I re-entered their employ on November 1, 1941, as salvage officer in charge of their San Pedro Station and have been so employed ever since. We were kept very busy all during the war pulling off L.C.I.'s and L.S.T.'s stranded off the coast of southern California during practice maneuvers. We also pulled off several merchant ships and towed in others disabled at sea. We worked two months off Clipperton Island rescuing the Navy salvage vessel ARS-26, which had become stranded on that island while attempting to pull an L.S.T. off the beach. On another job we had, we skidded the L.C.I.-371 up above high water, rolled it half a mile down the shore to a sandy beach and launched it. Later, it went to the South Pacific and was cited for its outstanding

performance as the first rocket ship. We are still operating under our contract but are engaged mostly in towing and delivering ships of the "moth-ball" fleet from San Pedro to San Diego.

"While I was acting as manufacturers' agent, I was representative for Frank Payne, selling his metallic and condenser tube packing. He generally comes out this way once a year, and we try our best to get together. He was here a week or two ago and had lunch with me in the *Viking*, our salvage vessel. He is the same old Frank, prosperous, and very loyal to his old friends. So much for my business activities. Now for the family. Yes, I'm twice a grandfather and probably a typical one, as I not only think but know our grandchildren are in a class by themselves — a little girl, Althea, 20 months old and a boy, Robert Sherman Gardner, nearly five months old. My son, Stephen A., was graduated from Whittier College in 1940 and entered the employ of the North American Aviation Corporation. Beginning at the bottom as timekeeper, he became one of the authors of their instruction book and was later advanced to the co-ordinating department. In November, 1941, he married Althea Tracy, formerly of Bridgeport, Conn. Later, after taking the Naval Officers' Training Course at the University of Arizona and at Fort Schuyler, he was graduated as an ensign and assigned to the Amphibious Force at San Diego. He went overseas in December, 1943, and served in Honolulu and aboard the APA-76 in the South Pacific. He received his discharge as a junior grade lieutenant and is now public relations director for the San Diego Baseball Club in San Diego. What would our old English prof say if he knew a son of mine was making writing his profession? If you remember, I had quite a time with my English course. It's a good thing Steve takes after his mother. Mrs. Gardner and I are pretty proud of our son's family and thoroughly enjoy visiting back and forth, as they live about 125 miles from us. Confined as I am to a telephone and always on call for a possible emergency, I don't get around much. However, I do hope to get back to one of our reunions one of these years. Please give all the gang my very best."

And lastly, from Frank Chesterman, we had the following word about problems of last spring: "My son-in-law is being transferred to Boston as of June 1. He is associated with the Westinghouse lamp division. My daughter and he expect to be in Boston on May 10, 11, and 12 to look around for a place to live. They don't know anything about the environs but are going to look around Wellesley and the Newtons. Do you happen to know anything about real estate men they might consult, or do you know something about the general neighborhood they might look into? Schools are a major consideration (they have two children), and if it means commuting to Boston, I suppose that the Boston and Albany would be the most convenient means." Sorry, Frank, that I haven't an "in" on housing. Speaking of housing, F. Charles Starr has returned to Boston after many years and is with the Federal Housing Authority at 53 State Street. Charlie has taken residence at 51 Lovett Street, Beverly, Mass.

Now for some more recent news. On June 13, 14, and 15, fourteen dyed-in-the-wool reunioners, with eleven of the wives (just as d.i.t.w.) got together at East Bay Lodge in Osterville, Mass., for our 42d reunion. Present were the Balls, Barriers, Files, Stricklands, Robbes, Towers, Lovejoys, Goldthwaits, Prescotts, Shapiras, and Gilmans, also Gil Joslin (fresh back from Canada to make his permanent home in Boston), Balkam, and Henry Buff. Although we had fewer present than last year, a good chummy time was had by all, and it was decided that, whether or not the Class should decide upon annual reunions in the future, this group, just to perpetuate the friendship thus established, would try to meet informally at least each June, saving perhaps a big bunch of enthusiasm for a rousing 45th in 1950. Before that date, a committee will endeavor to ascertain whether the 45th will be held at Cape Cod, Old Lyme, Boston, or New York. Gentlemen (and ladies) be prepared to cast your ballots, as the present regime is regaining only because no other regime regimes.

At the Alumni Day luncheon on June 14 were seen Andy and Mrs. Fisher and guest, Gil Joslin, Chesterman, Doc and Mrs. Lewis, Court and Mrs. Babcock and Bob McLean. Andy pronounced it the best ever (quality of attendance). At the '05 table on Saturday night were Babcock, Buff, Joslin, McLean, and Charlie Starr, with Chesterman at the head table to present the alumni gift. Regrets were received from many of the fellows, including Jack Flynn in Buenos Aires, who hopes to get back to Yankeeland in 1948. Jack says, "I may retire from some of my activities, particularly the steel business, not on account of me but because it's the set policy of steel to throw out on the scrap pile all men over 65. I find lots of good value in scrap." Come on back, Jack. We'll use the scrap.

Dick Senger, director of technical employment and training for the American Smelting and Refining Company, and formerly general superintendent at the company's smelter at Garfield, Utah, recently retired after 41 years with the company. Dick plans to travel and will make Salt Lake City his headquarters. — The Du Pont news release of July carries this announcement: "The retirement of Willis F. Harrington as a member of the executive committee, and his resignation as a vice-president of E. I. du Pont de Nemours and Company, effective August 1, were announced. . . . Mr. Harrington will continue to serve as a member of the board. Mr. Harrington's retirement terminates an active career with the Du Pont Company that began in 1904. He was born at Farmington, Del., in 1882. He was graduated from the University of Delaware with a bachelor of arts degree in 1902, and from . . . Technology with a bachelor of science degree three years later. His first employment with the company was as a chemist at the Eastern Laboratory in the summer of 1904. Upon completing his college work, he rejoined the company as a chemist at the Barksdale, Wis., explosives plant in 1905. A year later he became assistant superintendent of that plant and in 1909 was made superintendent of the company's dynamite plant at Du Pont, Wash.

In 1915, he assisted in the organization of smokeless powder manufacture at the Haskell and Carney's Point plants. He was made manager of the latter plant in 1917. In 1919, he was transferred to the miscellaneous manufacturing department and became its director the same year. In 1921, he was made director of the dyestuffs department, becoming assistant general manager in a new plan of organization the same year. In 1924, he became general manager of the department, and it was while he held this position that Du Pont developed into one of the country's leading manufacturers of organic chemicals. He was elected to the board of directors in 1927 and was designated as a vice president and a member of the executive committee in 1929."

A similar release from the United States Steel Corporation, dated July 1, reads as follows, "E. T. Barron is retiring after 42 years with the Carnegie-Illinois Steel Corporation. Mr. Barron was born in Connellsville, Pa. His career with Carnegie-Illinois began in 1905 at the Duquesne Works, following his graduation from . . . Technology with a degree in mining and metallurgical engineering. He became chief metallurgical engineer in 1942. Mr. Barron's associates presented him with a silver tray engraved with their signatures, at a farewell get-together held at Seven Springs, near Champion, Pa."

Frank Elliott's last letter is so newsy that we give it to you *in toto*. "I would have given a good deal to come down to Oster-ville for the reunion. This was impossible as I had just been operated on to remove cataracts from one of my eyes and about the middle of June, I was to have the cataracts removed from the other eye. A little sketch of what I am doing might interest you and a few of the others. I am permanently established here as sales manager of this firm, where I have been now for 12 years. My wife and I are in general good health for our age and live in a Cape Cod home which we built 10 years ago in Webster Groves, covering about an acre of ground and filled with thousands of flowers in our garden. We also have a country home about 40 miles from St. Louis, where we enjoy week ends and are able to accommodate up to 15 for a few days. Down here we have a swimming pool and a caretaker who takes care of cows, turkeys, chickens, and farm garden truck, which we furnish liberally to anyone who will take the trouble to go down there and enjoy it with us. This is not a large farm. It has only about 200 acres, and all we really use it for is fun. It has all the modern improvements, such as automatic gas heat and electricity and cold storage facilities. My son, who is 32 years old, served as a lieutenant in the Navy during the war and spent a number of months stranded in Korea, and later in Japan, because his ship had been struck by a mine and he couldn't get away. As with many other boys, his return marked a change in him which has taken some months to overcome. He is now in excellent condition and works here with me getting ready to take over my job as I expect to retire soon from business."

We now have a further report on the death of Royall D. Bradbury, furnished by Professor Spofford '93, as follows: "Royall

D. Bradbury, principal highway engineer for the Public Roads Administration and an authority on reinforced concrete, died suddenly at 63 in Washington, D.C., on March 21. Born in Jefferson City, Mo., he was educated at the University of Missouri and Technology. At the latter school he taught civil engineering for seven years. An article on the American Road Builders Association committee on rigid pavement design by Mr. Bradbury as chairman appeared in the *Road Builders' News* for December, 1945. He joined the Public Roads Administration in 1946. From 1916 to 1930, he was with several steel-wire manufacturers and construction firms as engineer and sales manager. From 1930 to 1945, he was engineer-director of the Wire Reinforcement Institute. He belonged to many engineering societies and was author of several technical books. His mother, his widow, a son and daughter, and a granddaughter survive."

Andy Fisher, who, when he first entered the Grandfather's Club, bragged about quality, is now stressing quantity. Graham Chambers Hunter (fifth grandchild) was born to William Armstrong and Edith Fisher Hunter at Richardson House, Boston, on Sunday, August 24. — Bob Fowler suffered a shock last spring, was confined to his bed for two months, but reports that he is gaining, is getting co-ordination, and hopes to be back in circulation before long. Bob's address is Robert W. Fowler, 92 Bartlett Road, Winthrop, Mass.

We have lately talked with Mrs. Wentworth about Harry, and she reports steady improvement in his condition up to the middle of August, when he became too ambitious and suffered a slight set-back; but he is behaving himself and is again gaining strength and co-ordination. — Ted Steel writes from Washington that his most exciting news is that his daughter is to be married this fall and that in another year, according to his company's regulation, he will have to retire at the ripe old age of 65 — some more good scrap on the steel pile (apologies to Jack Flynn). — Maurice Landers has a new address: Skunk's Misery Road, Syosset, New York. The housing problem must be tough down your way, Maurice. Another interesting thing comes to light in the changes of address. Lewis Hardy, I, is now the Rev. H. Lewis Hardy of Monmouth, Maine. No details available.

Mrs. Charles W. Johnston died at Portsmouth, Va., on August 31, after a long and painful illness. Present at the commitment at Forest Hills Cemetery in Boston were Marcy, Barrier, Ball, Fisher, Buff, and your Secretary. The sympathy of the entire Class goes to Charlie in his affliction. — FRED W. GOLDFTHWAIT, *Secretary*, 274 Franklin Street, Boston 10, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 69 Newbury Street, Boston 16, Mass.

## 1906

As the last class notes were in the June issue, it is in order to make a brief report on Alumni Day, June 14. Seven classmates and two ladies were present at the luncheon. They were Charlie Kasson and Mrs. Kasson, Ray Philbrick and Mrs. Philbrick; also, Bill Abbott, Ralph Clarke, Tom Hinckley, Andy Kerr, and Ned Rowe.

Ten of the faithful reported for the banquet at the Statler, including all the men who appeared at the luncheon, except Charlie Kasson, plus Henry Ginsburg, Bill Lambert, Abe Sherman, and your Secretary.

Classmates at the banquet missed the presence of Cupid Nash. The Secretary had received the following note from him: "It is with very deep regret that I must say I cannot be with you at the Tech Banquet on June 14. That husky mob is no place for an old cripple on crutches. I do greatly miss the annual get-together with the gang from '06 and am living in hopes that someday, somehow, I may see you all again." I am sure classmates will be sorry to hear of Nash's condition.

The following note from Chester Hoefer was penned on a post card mailed from Barcelona, Spain: "You may find in this card a reason why the 1947 reunion was not attended by me. Mrs. Hoefer and I are spending several months on the Iberian Peninsula and are enjoying our experiences to the utmost. Extend my best wishes to all '06 men." — Samuel A. Greeley, a consulting engineer in Chicago, has been elected as one of the 1947 directors of the American Society of Civil Engineers. — George Hobson, who has been living in Brookline, Mass., now has established his permanent residence in South Portland, Maine. It will be recalled that George is a retired Army colonel.

The Secretary regrets to report the death of two classmates, namely, John P. Davis, III, and William J. Knapp, II. Davis resided in Chelsea, Vt., and had been prominent in politics in that state. The following notes concerning him are taken from the Rutland, Vt., *Herald* of July 18: "John P. Davis, 64, of Chelsea, state purchasing agent under the Wilson and Aiken administrations, and former chairman of the Republican State committee, died . . . [on July 17] in the Massachusetts General hospital in Boston. Born in Lowell, Mass., on December 7, 1882, he was educated in the Lowell public schools, at Hopkinson school in Boston and . . . Technology. Mr. Davis moved to Vermont in 1912. He married Hannah Lord of Mamaroneck, N.Y., on May 21, 1914. He was appointed state purchasing agent by Gov. Stanley C. Wilson in April, 1934, and served until February 1, 1935. He was again appointed by Gov. George D. Aiken in February, 1937, and served until he resigned to become manager of the Wetmore and Morse Granite company in Barre. Later, when this company was consolidated with the Rock of Ages corporation, he continued as general manager of the Wetmore and Morse division. During the war he was assigned the task of starting and building up for his company a capacitor division which supplied the government with capacitors for war purposes. At the crest of the war work more than 600 persons were employed in this division. He was representative to the General Assembly from the town of Washington while he resided there in 1927 and from the town of Chelsea in 1933. He belonged to various Masonic organizations and was a Shriner and a member of Mt. Sinai temple in Montpelier. His wife survives him."

Classmates will recall Knapp as one of the outstanding members of the Class in his undergraduate days. The New York

Times of July 21 included the following account: "William Jared Knapp of 791 Park Avenue, New York, who retired in 1933 as president of the National Carbon Company, died . . . [on July 19] in the Glens Falls Hospital, to which he was brought . . . from his summer home on Lake George. He was 63 years old. Born in Brooklyn, a son of the late George Owen Knapp of Santa Barbara, Calif., Mr. Knapp prepared for college at Hill School, Pottstown, Pa., and in 1906 was graduated from . . . Technology. Starting his career as an engineer with the Peoples Gas Company of Chicago, Mr. Knapp later joined the Union Carbide and Carbon Company at its formation. He became vice president and remained with the company for sixteen years until he became an executive of the National Carbon Company. At his death he was a director of Douglas T. Johnson and Company, investment counselors, New York. Formerly for many years a resident of Rye, N.H., Mr. Knapp was active in community affairs there, and as president of the board of trustees of the United Hospital and vestryman of the Protestant Episcopal Church. Later, while living in Millbrook, N.Y., he was joint Master of Fox Hounds of the local hunt club. For some years he was first vice president of the Lake George Association. He was a veteran of Squadron A of the New York National Guard. Mr. Knapp leaves a widow, who was Louise Allen of Cincinnati at their marriage in 1910; two sons, Allen Knapp of Grand Rapids, Mich., and George O. Knapp 2d, of Buffalo; two daughters, Mrs. Frank A. Sprole and Mrs. Anna K. Chapman of New York; a sister, Mrs. B. F. W. Russell of Brookline, Mass., and five grandchildren. — JAMES W. KIDDER, *Secretary*, 50 Oliver Street, Boston 10, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills 82, Mass.

### 1907

With an attendance of 64, the largest number ever to be present at one of our reunions, with perfect weather conditions, and with a manifest atmosphere of joy and satisfaction among all the men at seeing each other, in many cases for the first time in 40 years, the 40-year reunion of our Class took place at the Oyster Harbors Club, Osterville, Mass., from the afternoon of June 20 until after dinner on Sunday, June 22, and was from every angle the most successful event of this nature ever held by our Class. It was extremely gratifying to those of us who had in our charge the detail of management of the affair to be assured continually during the days at Oyster Harbors that the men were having a wonderful time, and I have received letters from several during July and August expressing their feelings of happiness at having been present.

Phil Walker and I drove from Whitinsville, Mass., in Phil's car, picking up Howard Chase in Providence, and arrived at the reunion headquarters at about 12:30 p.m. on June 20. We were welcomed by Stud Leavell, John Frank, Sam Marx, Molly Scharff '09, and John West (Harvard '07) — the latter two being warm friends of the first three, and having attended previous reunions of ours. These five men had arrived at Oyster Harbors earlier in the

week for a bit of vacation. Roy Lindsay was also there, having reached the Club on June 19; and Harold Wonson had arrived on Friday morning. Harold was not able to be with us during much of the reunion, and we missed him. His younger daughter was married on June 21, so Harold had to leave us on Friday afternoon for his home in Bridgewater so as to attend wedding rehearsals that evening, and he was not with us again until Sunday forenoon. As we entered the dining room for lunch we noted a fine-looking gentleman seated at a table by himself, and Phil Walker said to me, "Is that one of our Class?" On a quick glance I replied in the negative, but more careful scrutiny led me to go to his table and say, "Are you Flint Elder?" and sure enough it was, from Cleveland, Ohio, assistant to the president of American Steel and Wire Company. We hadn't seen each other for 40 years, as this was his first attendance at an '07 reunion. Phil and Howard Chase and Flint and I ate together, Howard and Flint having a regular old home week, as they both came from Malden, Mass.

During that afternoon and evening '07 became more and more in evidence, and by midnight 49 of us were registered. The weather was pretty cool that day, so that for the most part groups gathered in the spacious parlors of the clubhouse rather than on the porches, but the warmth of the reception that each new arrival received from those already present was not affected by the outside atmosphere. It was my personal pleasure and privilege to stay pretty close to the club desk, to greet newcomers and to escort them to various groups and to give names all around, which was quite necessary in several cases, since 12 men who had never before attended a reunion were on hand, as follows: Fred Bachman, Gene Banfield, Chick Eaton, Flint Elder, Louis Freedman, Harold Kingsbury, John Mather, Floyd Naramore, Hugh Pastoriza, Ralph Randall, John Thomas, Arthur Tylee. It was interesting to watch the expression on the faces of the men change from that of wonderment as to who it was that I had in tow to that of recognition and delight as I gave the names. Then what hearty handclasps and even embraces! Chick Eaton and I approached Tucky Noyes from one side. You fellows will recall that these two used to run together in track in undergraduate days, but had never seen each other since 1907. Chick said to me, "Don't introduce me." He took hold of Tucky's arm. Tucky looked around. No quick recognition. Then a sudden, "Chick Eaton!", and they were off together in a corner for a talk of former days. This was a typical scene.

Saturday brought weather warmer and clear and also 15 more '07 men to Osterville. Some spent most of the day on the golf course. Dick Ashenden had charge of the golf part of our program and arranged a bit of a tournament. In reply to my request as to details, he wrote me on July 9: "Fourteen men entered the golf tournament. Ralph Hall took the first prize and Harry Moody the second. The Oyster Harbors course is a tough layout, so much so that it pleases most of us to leave our accomplishments as to scoring unrecorded." A group of 13 of us took a two-and-a-half-hour trip in a power boat among the

numerous islands along the coast near Osterville during Saturday forenoon, and others made a similar journey in the afternoon. At all times during the day groups of two or three or of 15 or more could be seen in various parts of the lawns and gardens chatting of days at the Institute, of mutually interesting business and professional work, or of the pressing problems before the United States and the world in which some of our mates have already played vitally important parts. A group picture of our party was taken late in the afternoon. It is a first-rate photograph. If any of you would like one, send me \$1.50, and undoubtedly one can be secured.

On Saturday evening the class dinner was held, all sitting down together and remaining around the tables until about ten o'clock. After the usual delicious dinner, Alexander Macomber, our President, after a few of his always happily worded remarks, called on me, and I read telegrams and letters of regret at being unable to attend received from some of the Class, and also gave a few statistics, some of which are recorded later in these notes. As class agent of the Alumni Fund, I presented a simple chart showing graphically the amounts given and the number of contributors from '07 during the seven years of the Fund's experience. Sam Marx responded to the President's call by telling one of his good stories. Stud Leavell, instead of telling stories or speaking in light vein, spoke seriously of the objective point of view that he had been able to get toward the United States during his stay of about two and a half years during 1943, 1944, and 1945 in Iran, Arabia, Egypt, and adjoining territories as official representative of the United States in a thorough investigation of the oil fields in these countries. He stressed the great problems before the world relating to these oil properties and their ownership and called on us to be informed and patient with the various nations and lands involved in the working out of these problems. Macomber then asked Ed Moreland, who was with President Compton in the Philippines on a special mission at the very close of the war with Japan and was then sent as the head of another official body into Japan itself, to tell us some of his experiences and observations. Those who had heard Ed along similar lines at a Boston '07 dinner welcomed this opportunity of hearing him again, and to the many fellows at the reunion who had never listened to him at all on this subject, his delightfully informal and informing story was a rare treat. Ed talked for about half an hour while we were around the tables, but after we had left the dining room some 25 of us gathered around him in one of the parlors and listened with undivided attention and interest as he continued to give us facts and observations from his own first-hand knowledge of the situation in Japan during and after the war. At about midnight some one suggested that Stud Leavell tell us something of his experiences in his travels in Iran, and elsewhere, and we stayed until 1:00 a.m. fairly spellbound while he told us of the apparently inexhaustible supply of oil in the ground in the territory he examined, and of some of the practical problems involved politically, economically, and commercially; also while he told of being the chief and honored

guest at dinners given by Arabian chieftains where everyone ate seated on the floor, using the right hands only and having no utensils of any kind to eat with, while rough-looking guards armed with daggers, revolvers, and swords stood around. Stud said it was like the *Arabian Nights* atmosphere, and he told the tales in true *Arabian Nights* manner.

Sunday, June 22, was again warm and beautiful. A few men played golf, but most stayed around the clubhouse, to use the few remaining hours of our gathering in conversation and good fellowship. Several had to leave the grounds during the forenoon for home or business engagements, and by early afternoon all had gone. Those present during at least part of the reunion were Charlie Allen, Dick Ashenden, Bob Albro, Fred Bachman, Clinton Barker, John Bradley, Lester Brock, Harry Burhans, Gene Banfield, Howard Chase, Bill Coffin, George Crane, Allan Cullimore, Paul Cumings, Leverett Cutten, Fred Dempwolf, Chick Eaton, Flint Elder, Harold Farrington, John Frank, Louis Freedman, Jim Garratt, Tom Gould, George Griffin, Ralph Hall, Hud Hastings, Ralph Hudson, Bebe Hosmer, Harold Kingsbury, Stud Leavell, Roy Lindsay, Henry Loring, Howard McChesney, Frank MacGregor, Milton MacGregor, Alexander Macomber, Hermann Mahr, Henry Martin, Howard Marvin, Sam Marx, John Mather, Ed Moreland, Harry Moody, Floyd Naramore, Bryant Nichols, George Norton, Tucky Noyes, Bill Otis, Hugh Pastoriza, Peabo Peabody, Bob Rand, Ralph Randall, Don Robbins, Molly Scharff '09, Ed Squire, Oscar Starkweather, Phelps Swett, John Thomas, Arthur Tylee, Chet Vose, Phil Walker, Stanley Wires, Harold Wonson, and John West, our adopted classmate.

Financially the reunion was a great success. We had no desire to make a profit, but due to the fact that our attendance was 64, while in our determining the proper amount to charge each man we figured an attendance of 45 as in 1942, we actually did overcollect on our fixed charges. The financial statement pertaining to the reunion follows. The receipts from those attending were \$1,937.00. Expenditures: publicity, \$58.94; rooms and meals, \$1,369.79; Massachusetts tax, \$38.07; garage storage, \$41.00; golf fees, \$108.00; boat hire, \$35.00; gratuities at club, \$140.00. The total expenditures were \$1,790.80, so that we made a profit of \$146.20.

The exhibit of photographs of groups and individuals of our Class taken during undergraduate days and since, of newspaper and magazine clippings about '07 men, of publications by business firms in which class members are executives, of our old senior portfolio, of the complete card index and statistics sheets of the Class, and so on, which was shown in 1942, and which had been added to greatly during the last five years, was a source of much amusement and interest to all. I have had much enjoyment in collecting these items and some material has been added since last June for our next reunion. The total number of men included in '07 by the Register of Former Students is 511. Of this number, addresses are known for 329; no addresses are known for 47; and 135 have died. This means that

26.4 per cent of the entire Class are deceased. Our graduating Class in 1907 numbered 209, and of these 52, or 24.9 per cent have died. On our class mailing list we carry 215 names, including all living graduates and 6 others who have manifested an interest in class affairs. Since our 35-year reunion in 1942, the following men whose names were on our mailing list have died: Lawrie Allen, Bert Bancroft, Harry Crohurst, Ralph Crosby, Roy Gale, Stuart Godfrey, Addison Miller, Stuart Miller, Howard Palmer, Eugene Phelps, Ed Prouty, Marcellus Rambo, Frank Shields, Frank Stockwell, Armen Tashjian, John Tetlow, Erle Whitney, Harold Wilkins, Dick Woodbridge, and Bill Woodward. At the class dinner during our reunion, I pointed out that, according to the American Table of Mortality Experience used by life insurance companies, of those living at age 22 — our average age in 1907 — 60.0 per cent will be living at the end of 40 years. This percentage of 511, the total number in '07, is 307, but we know that 329 are living and undoubtedly some of the 47 whose addresses are unknown are living, so that our class experience is better than the average expected for all men. This same percentage of 209, our number of graduates, is 125, but we know that we have 157 graduates living.

In looking back now, it seems quite remarkable to me that 64 men were able and interested to attend this reunion. The largest previous attendance was 50, at our 30th in 1937. At our five-year gathering, 43 showed up; at the 10th, 34; at the 15th, 38; at the 20th, 44; at the 25th, 38; at the 35th, 45. Moreover, three other men had paid for their full charges in advance but could not make it — John Kinnear, Ed Sargent, and Gilbert Small, all kept away at the last minute by urgent professional work. Clarence Howe, Minister of Reconstruction and Supply for the Dominion of Canada, had hoped to be with us. A telegram received from him at Oyster Harbors read: "Greatly regret that I find it impossible to join you at Oyster Harbors. We are in process of closing Canadian Parliament, which is the busiest period of my year." From Ed Marsh came a telegram: "Regret ill health prevents attendance." A telegram from Fred Schmidt, from Evanston, Ill., dated June 21, said: "Just returned from son's wedding in Maxton, N.C. Regret unable to attend." Furthermore, messages expressing regrets at inability to attend were received before the reunion from Arthur Christensen, Sam Coupal, Herbert Eisenhart, Fred Moses, Herbert Spear, and Bob Thayer. It looks as though the interest in reunions on the part of '07 men were on the increase. The fact is that while at Oyster Harbors last June a very definite desire was indicated by many of those present that rather than wait until our 45th, in 1952, for our next reunion, we have one in two years. So I have definitely made request to the management of the Oyster Harbors Club that they reserve June 17 to 19 in 1949 for our next reunion. Mark these dates in your calendar now.

I should like to be able to comment on the business or professional activities of all those who attended the reunion, but space will not permit. I am in the situation not common to any class secretary of having more material for these notes than I can

use. I do, however, want to give some facts concerning some of our fellows, both reunion attendants and nonattendants, which seem to be of particular interest, or which are entirely new because of lack of information during previous years. — Albert Burwell is chemical engineer for the Oklahoma Geological Survey, located on the campus of the University of Oklahoma at Norman, Okla. An extensive account in the *Oklahoman* of April 27, published in Oklahoma City, describes how our classmate has developed a method whereby volcanic ash, a gray powder that is abundant in at least 24 Oklahoma counties can be made into an industrial building and insulating material. Pumicell, as the new product is called, is fireproof, soundproof, moistureproof, rot-proof, and verminproof. It can be sawed like wood and is so light that it will float in water. Its insulating properties make it a practical wall boarding for refrigerators, cold storage lockers, and fireproof buildings. It can be made in sheets for shingles or in block for wall brick. — On July 21, Allan Cullimore sent me a copy of an exceedingly attractive magazine called "The Oranges and Montclair," devoted to the interests of these cities in New Jersey, in which appears a full-page cut of Allan, a most excellent likeness, accompanied by a long story regarding the Newark College of Engineering, of which he is president. Also I have received from Allan, rerouted through the office of The Review, a fine picture of him seated beside William J. Orchard '11, at their desks at the Constitutional Convention of the State of New Jersey, held during the summer of 1947 to revise the 103-year-old constitution of that state. We'll have this material in our class exhibit at our 1949 reunion. — A new address for Laurence R. Davis is in care of the San Miguel Lime Company, San Miguel, Calif. I do not know details of his new position.

Charles A. Eaton is president and general manager of the Eastern Engineering Company at 4 North North Carolina Avenue, Atlantic City, N.J., a concern doing heavy construction and hydraulic dredging for bridges, sewerage, water, dams, and such, now specializing in hydraulic pipe-line dredging. Chick was an assistant in the Mechanical Engineering Department at the Institute for two years after graduation, then served as a lieutenant in the United States Revenue Cutter service, Coast Artillery, and Ordnance until 1916, when for a year he was expert and works manager of the Energite Explosives Company at Renfrew, Canada. From 1917 to 1919, he was a major in the United States Army Ordnance Department, was then for two years works manager of a cutlery concern, and in 1922, with his brother, formed the construction company that he has headed ever since. He has married twice, his first wife having died in 1921. He has a married daughter and a son 10 years old, also two stepchildren both of whom are married. His home address is 4511 Atlantic Avenue, Atlantic City, N.J.

Louis A. Freedman was all smiles and energy at our reunion, as those of us who remember him as an undergraduate in Course II used to see him daily. Throughout the years he has maintained an office of his own as a mechanical engineer in New York City, much of his effort having been cen-

tered around improvements in the manufacture of electric batteries, although in recent times he has developed a floor lantern signal system, known as "Bell-Lite" for use with elevators, and at present is giving his particular interest to the Grafibre Elevator Railshoe Gib Laboratory, where he is manufacturing self-lubricating laminated elevator guide shoe gibs, now in use in more than 2,800 elevators in New York City. His business address is 33 West 60th Street, New York City. Louis was married for the first time in September, 1942, to Louise Peiler, Smith College, '39, and a former scholarship student at the University of Florence, Italy. Her father is Karl E. Peiler '04, and she has a brother now a student at the Institute. Louis is the father of a three-year-old-boy, a fine photograph of whom he showed us with justifiable pride. The home address is 309 West 105th Street, New York City. — Hud Hastings was elected vice-president of the National Council of the Y.M.C.A.'s at the annual meeting of the council in Buffalo, N.Y., on June 8.

I was delighted to receive early last June, as the result of a letter that I had written, a communication from André T. Koltatshevsky, at 61, Avenue de l'Art Flaman, Antwerp, Belgium. His letter reads: "For the 40th time, 'space-time' and other minor circumstances will prevent me from being with you and the rest of the youngsters at our reunion, and must I insist on how sad I shall be on June 20, raising my glass in silence without even the faintest echo of your festive libations reaching me over here. Unable to be with you personally, I am sending you my pictures instead (one taken in 1907 and one in 1947) and shall be glad to know that some of the boys who may still remember me have looked at them and smiled, as they smiled way back in 1907." From 1911 to 1925, André was engineer in charge of the telephone department, then chief engineer, shop superintendent, and technical director with N. C. Heisler and Company, Petrograd, Russia; then, until 1942, he was in the engineering department of the Bell Telephone Manufacturing Company at Antwerp and since then and at present is in charge of the technical library of that company, editing a weekly technical bulletin. The address given above is his home, where he lives with his wife, who was Emma Bardon when he married her in 1908. They have a son 37 years old who is married and lives in London, England. André comments: "Forgetting research and important engineering work, our most notable achievement seems to be the fact that notwithstanding two world wars, the Russian revolution, and the V-1 and V-2 flying bombs with which we were for six months gratified at Antwerp, we are still inhabitants of this planet." He still does water-color landscape painting, plays the violin, and writes plays "fit for ladies and their daughters," as his amusements.

I have recently learned that Frank H. Muchmore, who was associated with our Class in Course IV, died during November of 1945. — The Jacksonville, Fla., *Journal* of June 5 states that Thomas W. Roby, who has been valuation engineer for the Seaboard Air Line Railway since 1927, was appointed chief of research and planning for that railroad on June 1, with headquar-

ters at Norfolk, Va. — Claude V. Turner, with us in Course VI, died on August 23, 1945.

Willis Waldo wrote me on June 14 on a letterhead of Florida Ramie Products, Inc., of which concern he is vice-president, P.O. Box 1685, West Palm Beach, Fla.: "I am enclosing an article from an English trade journal, *Cordage, Canvas and Jute World*, written by me that describes what we are doing, with the headaches omitted. Ramie is a long, white, vegetable fiber with the appearance of silk and the strength, in pounds per square inch, of stainless steel. In one instance, a strand of wet fiber about the size of one's little finger tangled around a 3/8" wire rope. One end was held fast and the other wound itself around a power-driven rubber squeeze roll. It was the wire rope that broke, not the ramie." Willis sent some samples of fabrics made from ramie. The fellows who attended our reunion saw these and the letter and printed article in our class exhibit, previously referred to in these notes.

On July 9, Jimmie Walsh sent me a photostat of an award he had received in connection with war production activities during the past several years. It reads as follows: "The Council of the American Society of Mechanical Engineers presents this certificate of distinguished service to Col. James L. Walsh for his outstanding leadership as chairman of the society's committee on war production which exerted a powerful influence on civilian production of war materiel during World War II." (Signed by the president and secretary.) — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

## 1908

The Class was well represented at Alumni Day on Saturday, June 14. At the luncheon in Du Pont Court we had George Freethy, Jim McGowan, Jr., Henry Sewell, Miles Sampson, Ray Drake and Mrs. Drake, and Nick Carter. Although the weather was showery, tents had been provided, and the luncheon was as successful as usual. Quite a few of us met at the University Club in the Colony Lounge for cocktails before the banquet at the Statler, namely, Henry Sewell, George Freethy, Sam Gardner, Jim Gardner, Jim McGowan, Jr., Les Ellis, George Belcher, Nick Carter, and John Willard '09.

At the banquet we had a table in the balcony at the end of the hall, hence a fine view of the crowd, and it was a crowd, so large that attendance was limited to Alumni. We missed the ladies, who were with us last year. Eleven '08 men were present: Bill McAuliffe, Carl Hall, Ray Drake, George Freethy, George Belcher, Les Ellis, Jim McGowan, Jr., Henry Sewell, Sam Gardner, Joe Wattles, and Nick Carter. We were favored with special service, as the captain of waiters had at one time worked for Les Ellis and saw that we were well taken care of.

Linc Mayo, our Treasurer, reports that as of June 30 the Class has a balance towards our 40th reunion of \$426.41 with all bills paid. If there are any who have not paid their dues, Linc would be glad to hear from them.

Greg Dexter had a very interesting illustrated article in the February issue of *Foundry*, entitled "Applying Good Management in the Pattern Shop." Greg, who is senior partner of Slocum, Dexter and Company, 1060 Broad Street, Newark 2, N.J., will be glad to send any of you who desire it a reprint.

The following letter, dated July 22, has been received from Ralph J. Batchelder of Pasadena, Calif.: "I note with sorrow that Cookie has passed away. I had a nice visit with him last summer when I was in the East and did not realize that he was not well. I knew him well in the old days, and although I have not seen much of him in late years, I always read his name in the class notes with pleasure. He was a fine chap, and we shall miss him. I always notice (in your notes) that the members attending the meetings are the old crowd that I knew so well. If I were nearer, I should be there, too. There are some big disadvantages to living so far away. As I told you last summer, I am making plans to be at the 40th reunion next June, and I hope nothing will interfere with them. It has been a long time since I went to one — too long. Give my best regards to all my classmates."

Harry P. Sweeny has retired as senior technical adviser to the Bituminous Coal Consumers' Counsel in Washington, D.C., and may be addressed at 19 Green Street, Thomaston, Knox County, Maine. — Arthur L. Gardner, formerly production manager of Monsanto Chemical Company's Merrimac Division, was promoted last spring to the position of assistant to the division general manager.

We quote in part from a letter from Roger C. Rice, which accompanied his contribution to the Alumni Fund: "I am now watermaster and chief hydrographer for the San Joaquin Canal Company (California) and affiliated canal companies in the San Joaquin Valley. As this is a 'dry' irrigation year, we have to use the limited supply available from the San Joaquin River very carefully and the United States Bureau of Reclamation, which controls Friant Dam, is supervising with a tight rein this summer. By the way, our apricot crop near by is very good — five cents a pound, and you have the fun of picking them yourself."

We regret to report the deaths of the following classmates: Edwin C. Ball on May 29 [See also 1909 notes]; Arthur H. Hastings in July, 1944; and Robert Robertson on April 16. — H. LESTON CARTER, *Secretary*, 60 Batterymarch, Boston 10, Mass.

## 1909

The Review Secretary and Muriel, being obligated to be present at the summer convention of the American Institute of Electrical Engineers at Montreal, regrettably missed Alumni Day. However, Art Shaw, I, offered to take over and reports the following as present: George Bowers, I; Tom, I, and Alice Desmond; Delos, VI, and Emma Haynes; Francis Loud, VI; Lew, I, and Doris Nisbet; Gardiner Perry, VI; Julius Serra, I; Art, I, and Betty Shaw; Laurence Shaw, V, and his stepson, Walter Rapp; Henry Spencer, II; Harold Stewart, VI; John Willard, II; and Paul Wiswall, V. At the luncheon Delos Haynes had as

guests Mr. and Mrs. Norman Holland, the parents of the president of the graduating class. Mr. Holland is a contemporary of Delos in the patent field, and Mr. and Mrs. Holland made a pleasant addition to our small but congenial luncheon group.

Our President, Carl Gram, X, seems to be getting in deeper and deeper as a real dirt farmer and cattle king. We received the following from him last June: "Sorry not to be at Alumni Day on June 14. That is the time every year we have to go in the opposite direction to Staunton, Va., where is held the biggest sheep show and sale east of the Mississippi and many of the big sheep breeders of the West come on or have representatives. We also go to look over the best breeding stock and maybe purchase a desirable ram or a few ewes. This year we were invited to show, so Gloria (my daughter as well as my farm boss) is taking some of our sheep to show and sell. Sorry to let you down awhile ago when you wrote me. I was away that week end, and anyway, we farmers are terrifically busy these days — every day, nights, and Sundays."

Bob Hulsizer, VI, like Delos Haynes, is a well-established patent attorney, but with headquarters in New York City. On pressure from the Secretary, Bob has revealed the following data concerning Junior: "He obtained his B.S. in physics at Bates College in Maine and his M.S. in physics at Wesleyan, in Middletown, Conn. While there, he married his Bates classmate, Bernice Lord, a Phi Beta Kappa in Romance languages, and they now have two children, a boy, Steven, and a girl, Elizabeth Anne, aged four and two respectively. When we entered the war, he was drafted and placed by his Uncle Sam in the Radiation Laboratory at M.I.T., where he was occupied with various hush-hush programs, including radar, all during the war. When the war ended, he stayed at M.I.T. and was placed on half time as an assistant in the Physics Laboratory, working on problems connected with cosmic ray research, and the other half time is devoted to studies leading to a doctor's degree, which he hopes to receive some time in 1948. In June, he and his family are moving into one of the units of the Technology housing development along the Charles and considers himself very fortunate in this respect. Of course, as an admiring father, I could go on forever, but this is sufficient."

Along in the middle of August, the Review Secretary, at the Isle of Springs, Maine, received a telephone call from George Wallis, II, saying that he and Marcia were at Damariscotta, which is only 18 miles away. We, of course, persuaded them to make a slight detour and come to the island. We managed to squeeze in enough time for a fast ride in the run-about *Electra*, operated by Muriel, to Boothbay Harbor, and return, followed by some Maine lobster. The Wallises were just returning from a vacation trip to Canada, where George hooked several "big ones," all of which did not get away. They were en route to Wenham, Mass., to visit their daughter. We were most intrigued by George's Packard, which has a complete Pullman air conditioning system, a much needed accessory during the hot summer that has just passed.

In the early summer we received a leaflet notice that Molly Scharff, XI, was to be the speaker at a dinner meeting of the Technical Valuation Society, held at the Builders Club, 2 Park Avenue, New York City. The subject was "Valuation and Depreciation of Public Utility Property." The leaflet contained a picture of Molly, together with an outline of his distinguished career, beginning with the bachelor of science degree in 1909.

We are more than pleased to report as follows: "Colonel Rudolph William Rieckohl, II, and Mrs. Aimée Preston Wade of Detroit, Mich., née Aimée Preston of Ponce, Puerto Rico, were married in a garden wedding on June 7, at the home of Mrs. Ral Parr in the Green Spring Valley near Baltimore. Colonel Rieckohl was retired in October, 1945, after 34 years of service in the Army; he is a graduate of . . . Technology, '09, of the Harvard Graduate School of Business Administration, '33, and of the Army War College, '37. The bride wore light blue chiffon with her mother's white lace mantilla and comb and carried a prayer book festooned with ribbons and a spray of gardenias and stephanotis. The ceremony, in a military atmosphere, was performed by Colonel Ivan L. Bennett, Chaplain Second Army, and with Colonel Don L. Lowry, military aide to President Truman, acting as best man. Mrs. Ral Parr was matron of honor, and the bride was given away by Colonel David McG. Speed, also U. S. A., Retired. The officers of the wedding party were in white summer uniform, and many of the guests were in military and naval summer dress. The bride cut the wedding cake with her husband's Army saber at an alfresco luncheon and reception following the ceremony. Colonel and Mrs. Rieckohl will be at home after 1 October at 9580 Abbott Avenue, Surfside, Fla." The Class congratulates Colonel and Mrs. Rieckohl and wishes them years of happiness. (Also see The Review for January and April, 1945.)

In the Boston *Traveler* of June 27, nearly a full column with the title "Gracious Ladies" and headed with her picture, was devoted to Florence Luscomb, IV, and her manifold activities. The column began with her words, "Freedom of conscience, truth, speech, and political action are fundamental American constitutional rights. To deny them is subversive; to defend them, the duty of an American." The article pointed out that her forefathers had fought to establish the United States as a free country; her maternal grandfather, the late Samuel Knox, had served as member of Congress during the Civil War; one of her great uncles, the late Reuben Chapman, had been chief justice of the supreme judicial court of Massachusetts, and her mother, the late Hannah Skinner Luscomb, had been one of the first to fight for woman suffrage. We have already cited many of Florence's intensified activities in the interests of civil rights and justice for everyone, but she is working most ardently for the underprivileged and the persecuted minorities such as the ostracized Spanish Republicans. (See The Review for July, 1943 and January, 1946.)

Paul was more than active during the summer. He came to Boston to attend Alumni Day and then went to Detroit to visit his sister and his brother-in-law,

Arthur Fairbrother, and attend the wedding of his nephew Puff. After his return to Glen Ridge, he came to New Bedford, Mass., to attend the wedding of his cousin's son and spent a week end with an old school classmate at Providence in his native state of Rhode Island. He is planning to make his annual visit to his beloved Isle au Haut in Maine during the fall and will possibly include Friendship. In any event, during the summer he was honored by serving as toastmaster in the Sert Room of the Waldorf-Astoria. But let him tell the story.

"All of you who see anything of me know that if you say anything to me about the Dutch East Indies or my favorite island of Java, I am all ears. For something like 10 years, some of us here in New York who have a business tie with what we now call Indonesia, or have been in the Indies, have had an informal luncheon club known as the Java Tiffin Club. Tiffin, you see, is the name for the midday meal up and down the Asia Coast. Late in the summer a delegation from Indonesia came to the United States conference at Lake Success out on Long Island. By a stroke of good luck, our club was able to have a tiffin — or luncheon — at the Waldorf in honor of these visitors early in September, and I was lucky enough to find myself sitting at the head table between two of the prominent members of the party. One was (I am quoting from the official program) His Highness, Sultan Hamid II of Pontianak (Borneo), President of the Council of the Autonomous Territory of West Borneo. The other was His Excellency, President T. G. R. Soekawati, head of the delegation from East Indonesia, who lives on the island of Timor, which is east of Java and near Australia. Both men spoke perfect English! Both were in their middle thirties, I'd say. Theirs was Oxford English rather than American Yankee. I still marvel to think how beautifully they expressed themselves in a tongue that they had acquired in school as they grew up. It was not their native tongue nor even Dutch, the official language of the Indies. Neither could have been more than 35. I can tell you with deep feeling that I was delightfully entertained by these two charming and intelligent young men. I wish them success in their efforts to set up a stable and satisfactory government in their beautiful Indonesian islands. As their guide, friend, and counselor, they had with them Dr. Peter J. Koets, a member of the staff of Dr. van Mook, Governor-General of the Netherlands East Indies, and I can assure you that these fine men from so far away were in excellent hands. More and more am I convinced that there are many good men, fellow-members of ours in the human race, whose backgrounds are quite different from ours but who are, just the same, good men! Maybe, in fact, the highest compliment any of us can pay another is to say that someone we have just been lucky enough to meet is a good human being and that, I swear, can be justly said of these charming friends from Indonesia."

If you happen to live in a town where you get the publication, *This Week* with your Sunday newspaper, you noticed in the paper of September 7 a leading article about traffic problems and parking difficulties by none other than our indomitable

and irrepressible classmate, Tom Desmond. For a long time I have been convincing myself that there are few men in public life who are trying harder to solve some of the knotty problems of present-day living than our own Tom. As you know, he is state senator in New York State from a district up the Hudson near Newburgh. Tom's well-done story is a plea for more efficient traffic regulation — something that is sorely needed, as all of us who drive know too well. In New York parking is such a chore that I, for one, no longer make any attempt to drive to Manhattan. On many streets in midtown Manhattan you cannot park at all, and how often do the few parking lots hang out the sign with the doleful message: Full. Tom is on the right track, and I for one hope he gets somewhere in solving this chronic problem. Tom certainly is "in character" when he tackles such a job!

The death of Clark S. Robinson, X, has already been published in the July Review, page 541. His death seems to hit us particularly hard because so many of us knew him so well, and he was always so cheerful and co-operative, especially in sending us stories about himself and his family and other material for the class notes. (See The Review for May, 1943, December, 1944, March, 1945, and February, 1946.) We all realize the eminence which he attained in the war as well as the hard work in connection with chemical warfare. We all shall miss him.

Many of us, particularly in Course VI, remember Eddie Ball, VI, who began his Tech career with '08 but shortly became a member of '09. While driving on the Concord Turnpike near the Cambridge-Arlington line on May 29, he collapsed and died almost immediately. He was driving his niece, Mrs. Barbara F. Cowley, and her family, of Arlington, to their home when he complained of not feeling well. Fortunately, he stopped the car immediately. The Review Secretary knew Eddie particularly well, since we both prepared at Somerville High School and were always close friends. At that time he lived on Broadway, and as the neighborhood developed, it was named "Ball Square;" it is now a prosperous business center. Eddie was engineer with the Petroleum Heat and Power Company.

Also a notice has been received of the passing of Harold M. Glazier, IV, on July 31 at his home at Silver Lake, Ohio. He was prepared for M.I.T. at the Hudson, Mass., high school and at the Institute was a member of the Architectural Society and served on its executive committee. During the past 35 years he has been an architect at Akron, Ohio. Surviving him are his widow, Laura (Goodwin) Glazier; one daughter, Mrs. William McIlwain, both of Akron; two sons, Ronald, of Troy, Ohio, and Earl, of Cuyahoga Falls, Ohio; also seven grandchildren and a brother, Philip, of Greenfield, Mass. Burial took place in Cuyahoga Falls. — PAUL M. WISWALL, *Secretary*, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries*: MAURICE R. SCHARFF, 285 Madison Avenue, New York 17, N.Y.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

## 1910

At Alumni Day this last June, I was greeted by a member of the Class of 1912 whose name I do not remember, who said he had just visited Ed Stuart at the Veterans' Hospital in West Roxbury. Ed has been a patient at this hospital for the past three years and is physically helpless. During the afternoon of Alumni Day, Dud Clapp, Art Curtis, Carl Sittenger, and I were discussing Ed's condition and decided to go out to visit him. Ed is comfortably located but is helpless in every way except mentally. He was extremely glad to see us, called us by name, and recalled many of our activities while at Tech. It appeared to brighten him up to talk of the time when we were all together. Ed's illness began at the termination of his service in World War I. He was then a major in the Sanitary Corps and was stationed in Serbia. He was with the Serbian Army in their advance and their disastrous defeat. His main job was to eliminate the causes of typhus, and he ended his service in Serbia as director of the American Red Cross in the Balkan states. His excellent and unselfish service was the direct cause of his present illness, and Ed's health has never been normal since his return to this country. I feel that every classmate who knew Ed will want to write him. Letters, the personal visits of friends, and the radio are the only recreation he has. A letter to the Veterans' Hospital in West Roxbury will reach him, and visitors are allowed daily.

On June 1, I received a letter from Larry Hemmenway on the activities of the members of the Class in the environs of New York City. His letter, just too late to be included in the last issue of The Review, follows here: "The 1910 New York monthly luncheons still go on regularly and merrily. They consist mostly of the same old bunch, with a new member now and then. The attendance runs from 10 to 20. In May there were 14, namely: Benton, Henderson, Hemmenway, Gordon Holbrook, John Holbrook, Lodge, Phillips, Potter, Preston, Sargeant, Schleicher, Shaw, Sneddon, Trueblood — all vigorous men nobly withstanding life's onslaughts. Through the kindness of Hal Arnold, we now meet in a private dining room at the Mining Club on the fifth floor at 33 Broadway, New York City. (Take southbound, East Side, IRT subway, express, to Bowling Green.) Partly because we never seem to know when to break up, we gather at high noon, just as the sun goes over the yard arm (meaning 'time for a drink' to you landlubbers), so that those of us who still have to work for a living (or let our families starve) can get away and do at least a little work in the afternoon. Please particularly call our worthy classmates' attention to these luncheons and extend a cordial welcome to others around New York or visitors to join us. Anyone who does not enjoy it, need come only once. We have fun. I suggest that any prospect get in touch with Alfred I. Phillips, 92 Liberty Street, New York 6, N.Y. (telephone: BArclay 7-7067). He is our 1947 Guest Host."

The Class had more than their average attendance at the Alumni Banquet last June, 11 members being present: Jack Babcock, Dudley Clapp, Art Curtis, Gor-

don Holbrook, Murray Mellish, Dean Peabody, Holman Pearl, Al Phillips, Carl Sittenger, Clif Waldo, and the Secretary. It was Holman Pearl's first attendance at a Cambridge Alumni gathering in many years, and he looked exactly as if he had stepped out of the Senior Portfolio. Age has apparently not caught up with him. — Philip G. Larson has recently been elected president of the Connecticut section of the American Society of Civil Engineers.

The following is from the *Telegram-News*, Lynn, Mass.: "Appointment of William J. Keefe of Hingham, for 20 years Chief Engineer of Massachusetts Department of Public Utilities, as superintendent of rolling stock of the Eastern Massachusetts Street Railway Co., effective September 1, was announced. . . . As chief engineer of public utilities, Keefe exercised jurisdiction over all buses and trolleys throughout Massachusetts. He served as a lieutenant colonel in the Massachusetts State Guard during World War II, being placed on the retired list at the end of hostilities. He is a member of the American Society of Civil Engineers." — HERBERT S. CLEVERDON, *Secretary*, 120 Tremont Street, Boston 8, Mass.

## 1911

We had 16 members, five more than attended last year, present this year at the first wet Alumni Day in 13 to date. Of course General Kenney, I, was the big attraction, and Admiral de Florez, II, flew on in his Grumman with his son, Peter ('38), to attend. Fred Harrington, Aleck Yereance, and I were on hand at the M.I.T. Sailing Pavilion dock to greet De Florez, and Monk said this was the 35th anniversary of his writing an aeronautical thesis with the late Alf deForest, XIII.

Meanwhile George had arrived by motor with his sister and brother-in-law, L. Gordon Glazier, and their two daughters. Despite the heavy rain, the luncheon went off as scheduled outdoors in Du Pont Court under canvas, and then George was a principal speaker at the aviation symposium in Walker, the speech having been published in the July Review. Later a condensation of it appeared in the October *Science Digest* as "inventions the air force needs."

This year Course I had five 1911 men present, just nosing out Courses II and VI with four each, the attendance showing: Harrington, Kenney, Carl Richmond, O. W. Stewart, and Yereance (I); Obie Clark, DeFlorez, Ned Hall, and Jack Herlihy (II); George Cummings, Dennie, Hal Jenks, and Roger Loud (VI); John Alter (IV); Glazier (VII), and Emmons Whitcomb, X.

Speaking of Emmons Whitcomb, I certainly have apologized to him for having omitted in the July notes the name and address of the travel company with which he is now connected. Whit is with the Metropolitan Travel Service, 359 Boylston Street (at the corner of Arlington), Boston, and says the latchstring is always out.

It was fine to learn from George Kenney during the day that in early June he had been awarded an LL.D. degree at Notre Dame, where he gave the commencement address. It was no surprise to read in Ed Sullivan's syndicated column a day or two later: "Air Forces" General George Kenney returned his Notre Dame graduation ad-

dress check to Father Cavanaugh for the school scholarship fund 'in memory of the 364 Notre Dame men killed in World War II.' " In late August, George took a long flying trip to inspect United States air bases throughout the world, returning in early September.

Then in mid-September, George, addressing the first Air Force Association convention at Columbus, Ohio, warned that there are known weapons of mass destruction more deadly than the atomic bomb and that these weapons are "far cheaper" and can be "more quickly produced" than the A-bomb. "There are," he added, "aircraft in the hands of potential enemies which can carry these weapons to this country. Whether we like it or not, the laboratories of the world are burning the midnight oil these days while the scientists, the physicists, and the engineers search for newer and more destructive weapons of warfare." In conclusion, he stated that it is his belief that this country is lulling itself into a false sense of security by virtue of atomic weapons, which, he predicted, "will be outlawed by international agreement, their use in wartime being prevented for moral reasons."

We lost another loyal classmate on June 2, when Maurice Thompson, XIV, died in Baltimore, Md. Born in Lexington, Mass., on December 5, 1888, Maurice worked successively for the National Carbon Company, the Chile Exploration Company, the General Electric Company, and the Baltimore Copper Company before joining the United States Bureau of Standards in Washington in 1921 and engaging for two-score years in researches on electrodeposition of metals. During this period he had published numerous papers on electroplating in the *Transactions of the Electrochemical Society* and the *Monthly Review* of the American Electroplaters' Society. He was among the first to use pH measurements in electroplating and also developed the high-sulfate bath for nickel-plating of die castings. In 1941, he joined the staff of the United States Bureau of Mines at Norris, Tenn., with which he was connected at the time of his death. Among his outstanding accomplishments there were electrophoretic dewatering of clay and the extraction of alumina from clays by the Pederson electric furnace process. He was a member of the publications committee and a director of the Electrochemical Society and also an active member of the Baltimore-Washington branch of the American Electroplaters' Society. He is survived by his widow, Mrs. Sophie Howard Thompson, a daughter, Mrs. Mary Thompson Arthur, and two grandchildren.

On June 7, in St. Paul's Episcopal Church, Woonsocket, R.I., Janice Rounds, daughter of Mr. and Mrs. Frederic W. Rounds of Woonsocket, became the bride of George Wheaton Denison, Sara's and my younger son. After a wedding trip to Lake Placid, N.Y., the young couple is residing in Cornish, Maine, where George is associated with his older brother, Orville, Jr., proprietor of Webb-Smith Publishing Company.

Sara and I were also happy to learn of the arrival on July 27 of our second granddaughter, Leigh Trumbull Barton, whose parents are Peter and Helen-Elizabeth (Denison) Barton of Boylston, Mass. They

also have two sons, Lincoln Denison, 5, and John Newell, 2.

On September 13, in St. James Church, Medford, Mass., Marie Elizabeth Herlihy, daughter of Jack and Mabel Herlihy, became the bride of Edward Grover Ledden, Jr. Thus, you see, this issue's junior notes center about your secretariat.

During the second week in August, your Secretary attended the National Institute for Commercial and Trade Association Executives at Northwestern University in Evanston, Ill., and once again Jim Duffy, VI, lined up a dinner party in my honor at the Chicago University Club on the 13th. Although Jim was away on a trip at that time, and Ed Woodward, VI, was recuperating from painful, but fortunately not serious, injuries, following a motor crash, there were four 1911 men to greet me, namely: Lloyd Cooley, X, now with the Great Lakes Carbon Corporation; Wes Jones, II, sales engineer for the Barco Manufacturing Company; Bill Whitney, V, executive of the Creamery Package Manufacturing Company, and from Valparaiso, Ind., Paul Cushman, chief metallurgist for the McGill Manufacturing Company. Harold Babbitt, XI, on the faculty of the University of Illinois, sent regrets, which reminds me that Harold's book *Sewerage and Sewage Treatment* is now in its sixth edition. After a most enjoyable dinner and interesting chat, Paul and I went out to Comiskey Park and saw the Chicago White Sox beat Rapid Robert Feller, 8-7, under the night lights.

By the way, Paul has been doing a grand job as metallurgist for the McGill Company, and as a result of extensive experiments by him, the company opened a new \$30,000 heat-treating department on May 21. The firm is one of the first in the bearing industry to adopt isothermal hardening of bearing races, after this revolutionary heat-treating process was proven adaptable to the manufacture of ball and roller bearings less than two years ago. The following day, Paul described the process, commonly known as salt bath hardening, before the Valparaiso Kiwanis Club, of which he is a member. Later, I learned that Paul's name is now in "Who's Who in the Central States."

At the annual June meeting of the Alumni Council, Dick Gould, XI, was elected to the Civil and Sanitary Engineering Departmental Visiting Committee at M.I.T. for a two-year term, and by the way, you all remember that handsome booklet, "M.I.T. — A New Era" that was sent out as this year's annual Alumni Fund opened in April. Well, eagle-eyed Aurora Borealis Grossmann, III, discovered a flaw on pages 8 and 9 as follows: "I refer, of course, to the low-grade statistical trick of having the height of a human figure represent the data, whereas in reality it is the area which makes the impression on the human eye. Thus, on page 8, the drawings representing staff and other personnel in 1946 and 1929 have areas in the ratio of nine to one, whereas the numbers are in the ratio of only three to one — and a similar thing applies to the illustration for student enrollment on page 9. This device is commonly used in advertising patent medicines, but in this case I expect to make an exception and continue to make my very modest contributions to the Alumni Fund."

A nice letter is at hand from Ban Hill, I, retired street railway company president in Baltimore, in which he announces he is completing a book on "Depreciation." "It is a big subject," writes Ban, "it might even be called 'The Last Financial Frontier,' but I don't propose to call it that. What I have tried to do is write a short story, leaving out the logarithmic curve and the exponential equation, that a busy man could read in one evening and get some sort of a view of the whole subject. What I really started out to tell you was why I wasn't with you all at Alumni Day this year — it was the sciatica."

At the first student convocation of Northeastern University on September 5, President Ell, XI, speaking on the subject, "Investing In Your Future," told 850 freshmen (a record) that "the mere possession of a diploma does not make a man an engineer, lawyer, doctor, or businessman. "Now more than ever," said Carl, "educational capital must include practical training. It is only through a plan of education that combines theory and practice that a college student can combine both education and training." He was referring to the co-operative system of work and study in effect at Northeastern. Carl named three aims of the university: "We are interested first, in giving you the foundation for a successful career; second, in helping you develop your personality into a well-rounded whole, and third, in helping you select the particular work which you will most enjoy and which it will be good for you to follow and good for society to have you follow."

Congratulations to Cap Maguire, I, head of Charles A. Maguire and Associates, consulting engineers, Turks Head Building, Providence, R.I., for a \$107,000 contract, signed on September 9 by the public works commission, for a master highway plan to solve "all major traffic problems" of Metropolitan Boston. Awarding of the contract was voted by the Governor's joint committee on traffic to secure recommendations which "presumably would involve, in a very rough estimate, total expenditures of \$150,000,000." A full survey of possible overpasses, underpasses, bridges, or tunnels is to be covered in the master plan, which was contracted for after approval of the Public Roads Administration in Washington, which will pay approximately 50 per cent of the cost. Boston and approximately 30 suburban communities will be covered in the master plan.

A nice note in mid-August from Charlie McManus, I, engineer for the Massachusetts department of public works, stated that he and his bride, Elinor, were enjoying a well-earned vacation at Harbor Inn, Marblehead. He said he had begun a road in Methuen last December and finished it in late June, and this vacation was "between jobs" before an extension of the road was begun this fall. — "Here's hoping for a much higher average this year," writes Minor Dennett, II, in a note from Detroit accompanying his Alumni Fund contribution. "Except for our good friend, Zeke, the class average would be a whole lot lower." — Frank Osborn, III, is back in the States from Chile, where he spends a great deal of time for the Andes Copper Mining Company, and his address is now Walnut Road, East of Main, Vineland, N.J.

Harry Tisdale, V, returned to New York in late August after a business trip to South Africa (air transportation by Whitcomb). "I left New York via Pan American Airways on June 30," writes Harry, "and was in Johannesburg on July 2. My trip took me thence to Durban, Port Elizabeth, and Cape Town. I also went down to the Cape of Good Hope and saw all the sights, also going down into a gold mine at Johannesburg. It was a wonderful trip, but a bit hurried. I covered about 22,000 miles in three weeks and was back in New York on July 21, Grace being in New London while I was gone."

Once again 1911 is off to a good start in this, the Eighth Alumni Fund, with 115 subscribers (95 per cent of quota) totaling \$2,238.50 (80 per cent of quota), or an average contribution of \$19.42 as compared to 116 subscriptions averaging \$19.41 a year ago. — Well, mates, if you are in or near Boston on Friday, November 7, come on over to the Silver Room at Walker Memorial, M.I.T., for the annual "Seven Come Eleven" class dinner that evening at six. — ORVILLE B. DENISON, *Secretary, Chamber of Commerce, Gardner, Mass.* JOHN A. HERLIHY, *Assistant Secretary, 588 Riverside Avenue, Medford 55, Mass.*

#### 1912

A large and enthusiastic group of classmates and their wives attended the 35th reunion of the Class from June 6 to 8 at East Bay Lodge, Osterville, Cape Cod. The committee on arrangements, consisting of Arthur Campbell, James A. Cook, Albion R. Davis, Ernest W. Davis, Erwin H. Schell, and Fred J. Shepard, did a splendid job on everything but the weather. The Lodge was comfortable and well adapted to the event, the food was good, and the weather was conducive to intimate gatherings, card games, and other indoor sports. The men present greatly enjoyed the opportunity to become better acquainted with one another than ever before.

The following members of the Class attended with their wives: Andrew F. Allen, XI, VII, Frederick W. Barker, X, Frederick H. Busby, VI, Charles H. Carpenter, II, James A. Cook, VI, Harold W. Danser, VI, Albion R. Davis, II, Ernest W. Davis, VI, Charles E. Dodge, I, Jesse F. Hakes, I, Norwood A. Hall, VI, Charles C. Jones, I, Milton Kahn, X, Eric Kebbon, IV, Harold C. Mabbott, II, Harold G. Manning, X, Edward M. Mason, VI, Hamilton Merrill, X, Harold D. Mitchell, X, Bernard H. Morash, VI, Aksel M. Pedersen, X, John M. Pettingell, I, Jabez H. Pratt, X, Donald H. Radford, II, Wilbur T. Roberts, I, Frederick J. Shepard, Jr., VI, John D. Shore, IV, Cyrus F. Springall, IV, Bates Torrey, Jr., X, Charles L. Tuller, VI, Cecil B. Vaughan, II, Louis S. Walsh, X, Charles W. Webber, VI, Lester M. White, X, John E. Whittlesey, II, and Raymond E. Wilson, II. Morash and Radford brought daughters along. Professor Jerome C. Hunsaker, XIII-A, Professor Erwin H. Schell, II, Eugene T. Marceau, X, and Robert J. Wiseman, VI, attended alone.

The high point of the reunion was the class dinner, held on Saturday evening. The old class spirit, present in full measure, was not diminished by the champagne which the committee had provided for this memorable occasion. Honors for the largest

attendance were shared by Courses VI and X, each having 11 members present out of a total of 40. At the dinner, Fred Shepard read greetings from a number of men who could not be present. Weenie Schell gave an informative and humorous talk on the present status of affairs at the Institute and future plans for expansion. Jerry Hunsaker presented a most interesting account of the development of the Course in Aeronautical Engineering. Eric Kebbon summed up the thoughts and feelings of the group in well-chosen words. Doc Cook, with two husky assistants, showed his engineering skill and ingenuity in a display of old class pictures on an old opaque projector. Les White ran movies of previous reunions that some of the boys had brought along. The whole affair was immensely enjoyed by all those present and will be long remembered.

One subject of considerable discussion and comment was the dearth of class news in *The Review*. Les White has agreed to help Fred Shepard round up news and prepare it for publication. Cecil B. Vaughan is co-operating in the New York area. A determined effort will be made to have a better showing in the future. The response to this new arrangement has been very encouraging, and the next issue of *The Review* will contain a lot of news from the men who have already written in. In order to keep this up, however, it will be necessary for each member of the Class to get into the habit of dropping a note to Lester White, at the address below, whenever anything of interest comes up about work, play, family, travel, or other activities. Do it now. — FREDERICK J. SHEPARD, JR., *Secretary, 125 Walnut Street, Watertown, Mass.* LESTER M. WHITE, *Assistant Secretary, 4520 Lewiston Road, Niagara Falls, N.Y.*

#### 1914

June fourteenth may be counted as another successful Alumni Day for our Class, as would have been anticipated from the date chosen. But it remained for our honorary member, William Jackson, to make the headlines. The Boston *Herald* the next morning carried on the front page a picture of four-star General Kenney '11 chatting with Jackson. The title read, "Strategic Air Force Head General George C. Kenney of Brookline, M.I.T. '11, and William Jackson of Swampscott, M.I.T. '14 talk over old times at Tech's Alumni Day." We can always count on William to promote Fourteen.

As has become our custom, we held an Alumni Day class meeting late in the afternoon at the Engineers Club. We had as our guest Vice-President Moreland '07 of the Institute. Those attending one or more of the Alumni Day events were Blakeley, Chatfield, Des Granges, Dunn, Fales, L. S. Hall, Hamilton, William Jackson (hon.), H. A. Morrison, Tallman, Harold Wilkins, and your Secretary.

Two more classmates have been added to the ever-lengthening list of those deceased. Somewhat belatedly word has come of the death of Charles Shaw in Pasadena on January 30. Shaw came to the Institute from the Springfield, Mass., technical high school and was with the Class during the whole four years, taking Civil Engineering. On graduation he, Al Milliken, and Chet Ober joined the Coast and Geodetic Survey. It will be recalled that Milliken died

in World War I. After eight years, Chet Ober resigned from the Coast and Geodetic Survey and is now New York manager for the *Iron Age*. Shaw, however, stayed with the Survey and made it his lifework. He had been unable to attend reunions because usually he was in some remote part of the world. At the time the Japanese struck at Manila, Shaw was one of a group of Coast Survey officers in the Philippines and was imprisoned during the whole war. It was not until the end of the war that it was learned whether or not he was alive. The prison experience was so severe that Shaw was returned to the United States in very bad physical condition. He was trying to regain his health in Pasadena when he finally succumbed to the experiences of his imprisonment. Shaw is survived by a wife, a son who is entering California Institute of Technology, and a daughter who is married and has two small boys.

New York classmates who had seen Bob McMenimen around New York early in the summer were particularly shocked to read in the New York papers that Bob had died suddenly on July 30 in Monrovia, Liberia, of a coronary embolism. Bob, who was vice-president of the Raymond Concrete Pile Company, had flown to Liberia to inspect a large dock works his company was completing there for the United States Navy, and also to participate in the centennial celebration of the republic. When leaving the United States, Bob appeared to be in the very best of health but died suddenly a very few days after arriving in Liberia. His body was returned to the United States in a Naval escort carrier, and after services in New York, burial was in his native Cambridge, Mass. McMenimen has spent his entire life in the construction business, much of which was with the company of which he was vice-president. Some of the large projects in which he had had an active part were the Hudson-Manhattan tubes, the seven-mile San Francisco Bay toll bridge, and a number of Pacific naval air bases. During the recent war he was a member of the operating committee of the Contractors Pacific Naval Air Bases, which directed widespread building activities for the Navy. Bob is survived by his wife, but there were no children.

Edward B. Peck, who received his master's degree with us in 1914, was the recipient of an honorary degree of doctor of science from Clark University in Worcester at their spring commencement. Peck already has an earned doctor of philosophy degree from Clark. The award was primarily for his work in the field of production of high-test gasoline. He has, however, made many contributions in the field of petroleum chemistry. Your Secretary was also a recipient of an honorary degree, that of doctor of engineering, at the spring commencement of Norwich University. Picking up information regarding these honorary awards is quite difficult, and your Secretary would appreciate hearing from other 1914 men who may have received such.

He would also like to remind you that the Alumni Fund is very much in existence and is doing a splendid piece of work in providing capital needs for the Institute. In the Fund year recently closed, Ross Dickson, our Class Agent, was one of the distinguished alumni agents who were

responsible for putting their classes over the 100 per cent quota mark, both in numbers and in dollars. With the number of men lost by death in very recent years, raising the class quota is going to be increasingly difficult. Ross would therefore greatly appreciate the assistance of every member of 1914 in forwarding this good work.

Phil Morrill, who is vice-president of the Bemis Brothers Bag Company and has been stationed in St. Louis for about 30 years, has been moved to the Boston office as chief of a new administrative division of the company. It is like coming home for Phil, who was brought up in Haverhill, Mass., a town very near Boston.

As the Army is shaking down to its peace-time basis, a substantial number of officers with the temporary rank of general have already been returned to their permanent grade of colonel. One of these is Jack Wood. Jack is now back from Europe and stationed at the headquarters of the Army Ground Forces at Fort Monroe, Virginia. Your Secretary thought he had turned up some interesting information about James M. White as the winner of awards for foreign service. Although it turned out to be another James M. White, the error opened up some correspondence with our Jimmy, who reports that he is still actively associated as a principal officer of the Peppard Seed Company at Kansas City, Mo.

Dean Fales is a member of the advisory board of the Boston Automobile Club, which is a division of the American Automobile Association, and his smiling countenance appears on some letterhead advertising of that organization. Your Secretary, however, has a much better picture of Dean seated in a 1909 Simplex which he is planning to drive in this fall's Glidden tour of old-timers — both cars and people.

Almost every issue of these notes could make some reference to the activities of Donald Douglas. Probably most of you have seen the statements Don has made this summer in regard to the rise and fall of military aircraft production. The problems involved in the financing of the aircraft companies are certainly something to give their managers headaches. Production ratios between the boom and the indicated immediate future are something like 100 to 1.

A second of Leicester Hamilton's daughters was married recently. His daughter Helen was married on August 9 to David Sibley Paulsen of West Medford, Mass. The engagement of Jean Scott Wood to James A. Creighton, Jr., '41 was announced this summer. Like his father, young Creighton is a graduate of the Institute. Jim, Sr., is located at Hamburg, N.Y., and is associated with the Bethlehem Steel Company.

The first week in December has been set aside in recent years for a meeting of 1914 members around New York. As the Technology Club of New York is holding a dinner on Tuesday, December 9, in honor of Dr. and Mrs. Compton, it has been decided to omit a strictly 1914 dinner and combine our annual event with the Technology Club dinner. Charlie Fiske will send out details to classmates in the vicinity of New York, and any other 1914 man who is going to be in New York at that time should write Charlie for particulars of the dinner and

also a proposed before-dinner get-together. — HAROLD B. RICHMOND, *Secretary*, General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York 19, N. Y.

## 1915

Hello, everybody, hello! Here beginneth the first chapter of class notes for this year. Read, heed and write a letter about yourself, that your good works may be read by your classmates. There are only a few months to go on the Alumni Fund, and I hope you will all feel the urge to contribute again this year. From Shanghai, China, a letter and check from Pellian T. C. Mar, Rear Admiral, Chinese Navy, bring an intriguing touch of that quaint and distant land.

Mr. and Mrs. P. J. Munn of Wellesley Hills announce the engagement of their daughter, Beverly, to William E. Nessell, son of Mr. and Mrs. Fred E. Nessell of Washington, D. C. Miss Munn was graduated from Mary Washington College of the University of Virginia and from the Harvard medical school courses for graduates. Dr. Nessell received A.B. and M.D. degrees from George Washington University. He is a diplomat of the National Board of Medical Examiners, and a member of Nu Sigma Nu. At present, he is on active duty with the United States Navy Medical Corps. An October wedding is planned.

Our classmates continue in the public notice. In the July, 1947, issue of the *Sporting Goods Dealer*, Weare Howlett had an article, "Go West, Sales Managers," describing a five-weeks' trip he made up and down the West Coast. With no uncertain emphasis, Weare describes enthusiastically the conditions and opportunities out there. — Congratulations to Alfred H. Clarke, who was recently elected a vice-president of the Bemis Brothers Bag Company, to be in charge of a newly formed general production department. And to Herb Anderson, who has recently been elected vice-president and director of the H. Bunton Company, Philadelphia, a 59-year-old firm which makes knitting machines and special textile machinery. — With his check for the Alumni Fund, Abe Hamburg wrote, "Here's hoping for a 100 per cent increase this year." May all our classmates join to make this come true!

On June 4, Doug Baker wrote thus from the Presbyterian Hospital in Newark: "I have been here seven weeks to have a little job done on my back and am going home tomorrow for a few weeks before going back to work. I am now busy learning to eat and drink sitting up, after having acquired the art of doing it in a horizontal position. On the whole, I have had a fine vacation." Disturbed by this sad news, I immediately telephoned Doug and wrote him and was glad to get his second letter. I know you'll all join me in wishing Doug all the best, especially to be able to cast off those feminine accoutrements. He says: "Many thanks for your letter of June 11 and the good wishes contained in it. You should not be too sympathetic; it is not an exaggeration to say that I enjoyed most of the time that I was in the hospital. Perhaps my letter from the hospital was too woebegone. I think I did say that I would shortly be going home, and I meant that I

was on the road to recovery rather than that I was being put on the shelf. After taking July off as an additional holiday, I expect to be back on the job. For a time, my martial bearing should be noteworthy, but it is artificial and causes me to sympathize with corsetted ladies of the last century. I am now back at home and have achieved mastery of the stairs so that I can ramble around in the vicinity."

Bridge Casselman writes as follows: "My mail occasionally catches up with me, so I recently found your letter dated June 2. I am more than glad to make a contribution, despite the natural tendency to resist pressure, your pressure being very subtly and gracefully applied. At the moment I am keeping up three residences, and commuting between them as conditions permit. The old one in Pittsburgh takes our accumulated household furniture, whereas the one at 78 Greenway Terrace, North Forest Hills, New York, is the convenient one nearest my job (Eversharp, Inc., 32-36 47th Avenue, Long Island City, N.Y.). If any classmate knows where I may rent a house or apartment in Long Island without having to buy it or furniture, I would surely like to know about it. Mrs. Casselman and I are looking forward to the time when we can meet Mrs. Azel. Best regards from us both."

Shortly after this, on August 15, to be precise, the New York *World-Telegram* carried a long exposition of Bridge's views on shaving. Maybe he and Louie Young, the well-known Vice-President of the Gillette Safety Razor Company in Boston, should compare notes on beards, or cutting edges.

The acute housing situation apparently affects other classmates, as Joe Livermore writes from 528 Wyndemere Avenue, Ridgewood, N.J., asking whether we could locate a place for his daughter and son-in-law, an M.I.T. sophomore, to live. With the aid of some of our good classmates here, especially Jac Sindler, I think we were able to help the young couple.

Sam Berke, who retired a few years ago after selling his Ben-Burk, Inc., distillers of the famous "Old Mr. Boston" products, is now operating the 435-acre Deep Lake Farm at Lakeville, Conn., where he is raising registered thoroughbred cattle. Frances and I spent two summer days with Sam and Evelyn out there and were amazed at the extent of his operations and the beauty of his place and the surrounding countryside. Sam has developed a local boy into an M.I.T. freshman this fall, Hubert Knipmeyer, the first boy, I believe, to go to Tech from the local high school out there. We spent another week end at Charlie Norton's place on Martha's Vineyard. Charlie has given up sheep raising and farming to sell heating and ventilating equipment on the island and is doing well with his return to engineering and construction work.

Shortly after this typical letter, Ben and Margaret Neal were here to return their daughter Peggy to Pine Manor at Wellesley. We had dinner and an evening with them and Gene and Ruth Place. It was a gay evening. Margaret went real Back Bay on us with a plastic lorgnette which overshadowed Ruth's silver oxfords, resulting in Ruth's classic contribution for these notes: "Peg Neal hasn't the nose for oxford glasses — only Ruth Prior Place of

the 1634 Thayers of America could wear them. Where does she get off?" Fortunately, it was settled peacefully! From Ben we hear: "You old raccoon! Being the hypocrite that I am, I presume it is about time that I should start building my fences, and with that idea in mind I am enclosing herewith my contribution to the Alumni Fund. Peggy is due back at Pine Manor on the 23d of September, and although we have no definite plans as yet, I have it very strongly in my mind to go down this time with some latitude and spend a few more days as the spirit dictates. In any event we shall look forward to seeing Frances and you in the very near future, and this time, I swear by all that's holy, that we will not slip up on giving you a ring on the telephone." I might add, the *spirits* dictated.

It was good to welcome back these 1915 men on Alumni Day, June 14: Bill Brackett, Fred Cook, Fanny Freeman, Gabe Hilton, Parry Keller, Clive Lacy, Larry Landers, Arch Morrison, George Rooney, Henry Sheils, Kebe Toabe and his son Sidney L. Toabe, Max Woythaler. A pleasant aftermath of the dinner and day is Parry Keller's fine letter: "The summer is slipping by very quickly, and it seems only last week that I was in New England and talking to you and the others. . . . The time I spent in Cambridge, Boston, and vicinity, during the middle of June was a very happy experience. It was certainly a pleasure to have the opportunity to meet Frances in your home and with such congenial company. I appreciate your thoughtfulness in looking me up and asking me to join the group. It is a treat for me to get together with the boys, and this time it was all the better because some of their wives were present. I had a wonderful time. I also enjoyed the Alumni Dinner later in the evening at the Hotel Statler. As far as I know now, my plans are set to visit New England next June and be there for Alumni Day and other Institute activities. In regard to Frances, she more than exceeded our expectations. How did you ever sell yourself to such a fine lady? I know now that you will be a better class secretary than ever, if that is possible. I have been very busy, since returning to Akron, and with my job and some incidental traveling, have had little time for extracurricular activities. I met Herman Morse several days ago and passed on your greetings. He wants to be remembered to you and says to tell you that he regrets his inability to be with us last June. I have not yet had a chance to see Norris Kimball but will tell him about the party and the other affairs of last June when I do see him."

Class dinners in Boston and New York this fall will open a campaign for our 35th in 1950. Come, all ye faithful!

It's sad to record the passing of a number of our classmates. Don Perin died in Greenfield, Mass., on June 19. Charles W. Whitall died at Ossining, N.Y., on June 14, 1946. Robert A. McMenimen died on July 30, in Monrovia, Liberia, where he was representing the Raymond Concrete Pile Company of New York on a large harbor development project. James E. Mullaney, building inspector of the City of Somerville, Mass., died there on August 8. The Class sent flowers to Don Perin's funeral, which Henry Sheils and I attended at Mt. Auburn Cemetery in Cambridge. To the

families of all these men have gone class letters of sympathy.

It's nice to report that San Willis has recovered from his recent illness. I'm sorry Fran and I were unable to get to Maine to see San this summer. A letter written in July reads as follows: "This is a short note to confirm our verbal invitation to your good wife and yourself to visit us whenever business or pleasure brings you Portland-wards. We are so close to the city and the transportation facilities are so good that, except for the cooler temperature and the more pleasant surroundings, one might be right in town. We hope that you can make it and are sure you will find the visit worth while. My own affairs are progressing in that I am gaining some weight, and my average staying power appears to be improving. I still have some poor days with shortness of breath and other shortcomings, but they are further and further apart and do not prevent my getting my share of the mackerel, which are biting like sharks at the moment."

So, now let's continue the column with notes, news, and letters about yourselves. And let your lights shine with your Alumni Fund checks! — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline 46, Mass.

## 1916

Although it is rather belated news, I should like to mention the grand Alumni Day held last Spring. Many of the boys were there, Bob Wilson, Duke Wellington, Melville Rood, Shatswell Ober, Doug Robertson, Art Caldwell, and the undersigned. There may have been others whom I did not happen to see, and I should enjoy hearing from them if I have omitted any names. Duke and I went on a personally conducted tour of Shatswell's wind tunnel — a really interesting excursion. Doug Robertson told me he now has his private pilot's license, and Bob Wilson announced his election to the National Academy of Sciences, a truly unusual honor for an engineer.

I have since received the following letter from Bob: "There is not much new with regard to the job, which continues to be a very strenuous one. In addition, I am vice-president for refining of the American Petroleum Institute, and chairman of the refining committee of the National Petroleum Council. Recent honors include election to the National Academy of Sciences and an honorary LL.D. from Northwestern University in June. Mrs. Wilson and I were in one of the Pennsylvania train wrecks, that at Warsaw, Ind. Our coach turned over, and we had to crawl out through the broken window; but we were practically uninjured — and very thankful. Rusty White and Saul Hoffman were at the M.I.T. dinner at Chicago in June. Ed Hale and his wife were at the previous dinner in honor of Dr. and Mrs. Compton. Two of my daughters are married and the third is in college and planning to finish up at Technology in the School of Architecture."

Ed Barry, from Stone and Webster in Boston, writes, "Since 1942, I have been on the mechanical engineering staff here in Boston. Two and one-half years during the war were spent in Washington, D.C., doing special work for the company. I have nothing exciting to report except the

marriage of my oldest son, Ed, to Gertrude E. Hamper of Greenville, Mich. Ed is manufacturing pearl buttons at Macon, Mo. My other son, Jim, is a junior at Harvard and a licensed radio "ham." My residence is at 57 Craftsland Road, Chestnut Hill, Mass., and my wife and I spend our summer vacations at Governor's Island in Lake Winnebago."

As a Merrimack River Valley dweller, your Secretary is planning to read a report Tom Berrigan sent. Tom, you may know, is chairman of the Merrimack Valley Joint Sewerage Board, at 20 Somerset Street, Boston. His letter reads as follows: "To begin with, I am not much of a socialite. My social activities are generally limited to swimming at the Cape in July, stealing away from not more than two or three games of golf a year, and visiting with relatives and others in the vicinity of Boston and sometimes White Plains, N.Y. Respecting my business activities, I might say that I am chief engineer of the Sewerage Division of the Metropolitan District Commission and that I have additional duties as chairman of the Merrimack River Valley Sewerage Board. In addition, I maintain a law office and am associated in the practice of law with Judge Albert F. Welsh."

A most interesting letter came from Mark Aronson: "Your letter was forwarded to me and was awaiting my return from a vacation in the Pocono Mountains. Although I maintain an office in Boston, I am seldom there. Since 1940, I have been spending most of my time in Philadelphia and New York City. Before the war, I was engaged in the private practice of industrial research. This work was interrupted when I became identified with the Navy's war effort at the Philadelphia Navy Yard. One of my creative developments is covered by the enclosed news item. (The clipping tells of the award of a certificate from the James F. Lincoln Arc Welding Foundation. The certificate honored Mark and his associate for the excellence of a paper they had submitted which won a \$250 prize, in a nation-wide contest, its title being 'The Design and Construction of a Tilting Table for Efficient Armor-Plate Production.' This design solved a most difficult and strategic problem in the manufacture of massive armorplate for the protection of battleships and effects a tremendous saving in time over the previous methods employed.) From the design section, I was transferred to the industrial relations department and appointed administrator of the beneficial suggestions system, and also recorder of the committee on awards, the chairman of which was a Navy captain.

"In my capacity as head of the suggestion system, I was responsible for the administration and promotion of suggestions and ideas among the 47,500 employees. The importance of suggestion systems is being recognized more and more throughout the country as an effective means for cutting production costs and increasing efficiency of operations. Industry is coming to realize that the man on the job is often the expert most qualified to improve production methods in his particular niche, and that ways and means must be sought to make his knowledge available to management. Private industry has accepted it both as a money saver and as a means to better in-

dustrial relations. At periodic intervals, I would arrange a ceremony at the commander's office at which he would present checks to the successful employees in payment for their adopted suggestions. I am enclosing a few news items illustrating these ceremonies. The amount of payments was proportional to the savings effected by the suggestions. The maximum locally paid was \$250. Suggestions justifying a larger sum were approved and authorized by the Navy Department in Washington. Two suggestions which could effect savings of a million dollars, each received an additional payment of \$1,000. Suggestors whose adopted ideas promoted safety were given a standard payment of \$12.50. A certificate of honorable mention was given for a suggestion which did not warrant a cash payment but had some merit. Upon my return to the private practice of industrial research, I am resuming my pre-war interests and co-ordinating this work with applications in business brokerage, particularly in the purchase or sale of industrial plants as going concerns."

In scanning *Business Week*, your Secretary recently came across a picture of our own Thomas D'Arcy Brophy. Steve is president of the American Heritage Foundation, which is sponsoring a drive to impress the public with the fundamental ideals of American life. Their first project is the Freedom Train, which will carry a collection of priceless historical documents, including the Declaration of Independence, to some 300 communities throughout the nation. — The *Providence Journal* contains a social item of interest to our Class. Nicholas Mumford, Jr., '45 (like his father an M.I.T. man) was recently married to Rosemary Davis of Austin, Texas. — And in the political limelight is Mrs. Howard P. Claussen, who was recently elected president of the Women's Republican Club of Massachusetts. The Claussens live in Wellesley Hills.

Your Assistant Secretary has received a very interesting letter from Jack Freeman, who suggests that we cut out material if what he has written is too much. But it's all interesting stuff; so here it is, pretty much as Jack wrote it: "Your friendly persistence in numerous notes requesting information about me surely deserves a more prompt answer than it has received. I have enjoyed the results of your efforts and Ralph's, as expressed in the class news items, so should perhaps send in my own small share. As you know, I was at the National Bureau of Standards from 1917 through 1929 in the metallurgy division. On January 1, 1930, I joined the technical staff of the American Brass Company just in time to witness the effects of the depression of the Thirties on this great industry. My first duties were the development of a corrosion research laboratory. In 1934, I was made assistant technical manager of the Company and in 1938 found myself technical manager by reason of the death of my predecessor. As technical manager, I have been responsible for the quality of all production of the company in all branches and also have directed all metallurgical research and technical service to customers. The witnessing of the tremendous expansion of the company and the industry from the depression years to all-out war production was a stimulating experience. We pro-

duce about one-third of all brass, copper, and copper alloys in the United States and a much greater proportion of Canadian production in our Canadian branches. The maintenance and often improvement in quality coincident with expanding production was a most interesting problem, along with the conversion in character and type of production required by Ordnance, and particularly with the tremendous requirements for cartridge brass for small arms and heavy-caliber cartridge cases. The conversion back to peace-time products has likewise had its problems, with shortages and the use of vast quantities of scrap from the battlefields. Over the past two years we have been introducing quite successfully statistical methods of quality control and have been making extensive use, of course, of the now famous Dodge-Romig sampling inspection tables. I wonder whether many of our classmates have associated you with the 'Dodge' of these tables and appreciate their indebtedness to your most valuable contributions to systematized quality control, which was given such an impetus during the war period and has become of such great and increasing value to industry. As you know, I was married in 1926 and my wife and I had the unusual pleasure of a wedding trip around the world, extending it over a period of seven months. After the children arrived, our travels were not so widespread. They have now grown up, and we are starting on what I hope will be a series of summer excursions to points of world interest. On August 6, we fly to Mexico City for a week and then to Guatemala, flying home from there. The airplane makes possible educational pleasure trips within the confines of a two weeks' vacation. The oldest daughter, Marie, was graduated from Pine Manor last spring and is entering the Child Education Foundation in New York in the fall. John R., the 3d, has finished his first year at Lehigh, and Harriet, the youngest, has two more years at Dana Hall. Perhaps among their friends are children of classmates unknown to them. It would be interesting to know. This fall I am anticipating keenly a business trip to Europe to review brass mill practices and developments, particularly in England and Sweden. I hope that by another year conditions will permit taking the entire family over for a tour of education and renewal of old friendships and contacts of my earlier days of study in France and my several months' stay at the National Physical Laboratories in England."

Back in February, 1946, while in Pittsburgh, your Assistant Secretary attempted to reach George Ousler but was informed that he was closeted with the mayor of Pittsburgh in an attempt to settle the Pittsburgh utility strike. Now we have a little history on George and understand why he couldn't be reached. It is simply that since June, 1942, he has been vice-president in charge of sales of the Duquesne Light Company and Allegheny County Steam Heating Company. History shows that it was directly after graduation in 1916 that he went with Duquesne, where he has been climbing ever since. In 1926, he transferred from the engineering department to the commercial department as manager of a newly formed engineering division on costs and designs for substations and line extensions for customers' installations.

Then followed three steps as director of sales engineering, manager of sales development and the rate department of the gas, electric, and steam companies, to general sales manager in 1931 in charge of all general sales activities of the Duquesne Light, Equitable Gas, and Allegheny County Steam Heating Companies, which position he held until his recent election.

His letter gives the following account of more recent activities: "I have two children, George Walter, Jr., aged 13½, and Ann Laurent, aged 12. The boy is now at Shady Side Academy in Pittsburgh, and the girl at Mount Mercy Academy. The boy is just entering high school, and the girl is still in grade school. Shady Side is a school similar to Eaton and Andover. Insofar as what I have been doing in the last five years and what I am going to do in the next five years — the answer is 'work.' We have been so busy in this area that I don't find much time for hobbies. The industrial activity here during the war, together with difficult labor situations, has made the going in the last five years pretty rough. It seems to me that the next five years will still be pretty active, and I am afraid my nose is going to be close to the grindstone. My present position requires that I take part in a considerable number of outside activities, even though they require more work and I may not want to take them on. For example, I was recently elected vice-president of the Engineers' Society of Western Pennsylvania, and right now I am vice-president of the Pennsylvania Electric Association, and will have to assume the presidency of the latter next September. For the last two years I have been chairman of the commercial division of the Edison Electric Institute, which has also taken considerable time. I mention these merely to show that one has to assume many outside activities in addition to the work which he must do for the company."

We were very glad to receive this interesting note from Bill Wylde, who now lives in Stamford, Vt., the proper address for which, according to Bill, is R.F.D. No. 1, North Adams, Mass.: "I have been in the paper business continuously since acting for one year as an M.I.T. instructor at the Bangor, Maine, station of the Course X School of Chemical Engineering Practice and a year or so in France on a mission which was later proved to have been a useless gesture. I am now the operating head of the Deerfield Glassine Company, a paper mill located in Monroe Bridge, Mass. Although we are now in the process of expansion by erecting a large new mill in Texas, I hope and expect that I can round out my working days right here in New England. I have two children, one of whom made me a grandpappy last fall. The only 1916 men I ever see are Walt Aiken, who owns a nice machine shop business in Lee, Mass., and Jimmie Merritt, who handles the affairs of the Canadian plant of the Ohio Brass Company in Montreal. Jimmie and I manage to get together for a few days each year. If you or any other members of the Class ever happen to be driving through Stamford, Vt., on Route 8, and see an old bald-headed gink, who ought to know better, batting a bird around a badminton court in the rear of a white house in that village, stop in and we'll lift one together."

Ed Weissbach indicates that he is a little late in answering our letter but that he has not had much to say until lately. We welcome the following communication from Merchantville, N.J.: "The big news in this locality came to me by way of the 'grapevine.' I understand Fred Spencer is working just across the street from here at the R.C.A. plant and that he came down here the first of July. I have not seen anything of him yet but probably will before long. During the month of June, my wife and I took a vacation trip out to Ohio. We went by the new Pennsylvania Turnpike and stopped off in Washington, Pa., and then Cincinnati, where we visited relatives. After a short detour to Kentucky, we worked our way up through Ohio, stopping at Yellow Springs, and thence on into northern Michigan. On the way back, we stopped over in Detroit and spent the night with Spencer Hopkins. Spencer is with the General Motors Corporation, as you will recall, and lives out in Birmingham. He looks very well; in fact, he has changed very little since we knew him in Boston. His daughter, whom I had never met before, is a junior at Sweet Briar and is a very charming young girl. After leaving Spencer's abode, we thought we would take in Greenfield Village and Dearborn. Spencer warned us that we would just see a lot of old plows, but on the whole the trip was interesting even if we did get tired. After another night on the road at Medina, Ohio, we thought we would stop over in Akron and see Flip Fleming and some of the other boys, but it was raining too hard when we went through Akron even to find the road where he lives. We managed to see some members of other classes on the way — Fred Morrill '07, Albert Loring '34, and Fred Garber '03, all in Cincinnati."

The response for this issue has been most gratifying, and we only wish all the members receiving The Review would send either of us a few lines. — RALPH A. FLETCHER, *Secretary*, Post Office Box 71, West Chelmsford, Mass. HAROLD F. DODGE, *Assistant Secretary*, Bell Telephone Laboratories, Inc., 463 West Street, New York 14, N.Y.

### 1917

Again no attempt will be made to describe a reunion. The 30th was in many ways the best we have ever had. One hundred and six attended and found everything planned and managed superbly. The Wentworth-by-the-Sea, originally suggested by Bob Erb, seemed to have a net advantage over previous locations, judging from comments made. McNeill, Strout, Mehaffey, Littlefield, Meloy, O'Brien, Cochrane, and many others worked in a well-organized team toward the pleasure and satisfaction of us all. The only serious mistake was made by the nominating committee of Whitman, Blanchard, and Lobdell, who continued the present secretary in office. We were sorry to see that they felt it only fair to relieve Phil Hulburd of the task as assistant secretary in the knowledge that Phil's health has been such that not even the smallest added load is desirable. Phil's personality has been breathed into his contributions and has lent a pleasant change of atmosphere to the notes. Ted Bernard's annual contribution was offici-

ally recognized by naming him assistant secretary in Phil's place and thus wishing on him the privilege of additional chores. All other officers were changed, and some new positions created. The slate, as turned in by the nominating committee and formally voted, was as follows: President, Tubby Strout; Vice-president, (New York) Bill Sullivan, (Chicago) Sherry O'Brien, (Washington) Potts Mehaffey; Secretary, Ray Stevens; Assistant Secretary, Ted Bernard; Treasurer, Joe Littlefield; Archivist, Tom Meloy; Assistant Archivist, and Award of Merit, Win McNeill.

The program was carried out precisely as indicated by the announcements and needs no repetition for the record here. It was voted to publish the archives under Tom Meloy's direction in suitably printed and bound form. The cost is appreciable, and Newman Marsilius offered to underwrite most of it. The balance is underwritten by several individuals, and it is hoped that the orders placed for the copies will make it unnecessary to call substantially on the underwriters. Unfortunately, Marsilius was prevented at the last minute from attending, but a vote of appreciation was passed and forwarded to him. The golf prizes exceeded the number of possible winners, so that even your Secretary won a prize. A special prize was awarded Executive Vice-president Lobdell, who shared with thirsty friends a case of California Packing's best prune juice. Possibly the pleasantest touch about the awarding of the prizes, as with the whole Saturday evening dinner, was that no speeches were made. Your Secretary will be forgiven if for him this reunion remains the high spot in the many class gatherings. He was overwhelmed by the presentation of a wrist watch that will always be treasured. His feelings are deeper than he dares attempt to express.

Irving McDaniel was not able to be present, but he wrote as follows: "After several months in naval hospitals, I was retired physically from the Navy on January 1. Before I left Washington, D.C., Sully and Bill (Potts) Mehaffey and I were counting on being present at the 30th. Sully was always tops, but like the finest of wines he improves with the years. May I suggest that one day of the reunion be called 'Sully's Day'? He really rates it. I have retired to southern California and have started an avocado ranch — will write you more details later after we build and have a mail address. I saw Lin Noyes during the Christmas holidays — same old Lin. Did you know that Yank had a special 'Lin Noyes' edition"?

Commodore Sullivan was present in person and autographed lithographs done by Nel Chase. He expected to return for a quiet stay in or near Washington, but within a few days we received a post card from him from Tokyo. On his return he had been given two hours to catch a plane because of a ship salvage problem that needed his immediate and personal attention. He reported that all the old-time color was gone from Tokyo, that prices were sky-high with little for sale, and that many flimsy buildings were being erected.

General Groves, after giving us off-the-record talk about such atomic matters as he was free to discuss in this way, returned to Washington, where he assumed new re-

sponsibilities with the Atomic Energy Commission. Senter returned to Texas; and Tourtellotte and Kelly, to the management of great affairs in the Northwest. Dutch du Pont could not be on hand. He wrote Leon McGrady that he was recuperating in the hospital, after having starved the medical profession for some 50 years.

Stan Dunning is on the move again as his company, Wesco Waterpaints, Inc., has moved its eastern factory and office from East Boston to Trenton, N.J. A much larger plant and better facilities are available there. Stan is eastern division manager for Wesco as well as general manager of its Canadian division.

Recent news items included mention of the following: Anselmo Kriger, continuing his athletic inclinations, purchased a block of 100 tickets to a major league game at Braves Field to welcome player Jackie Robinson of the Dodgers. Thomas W. Ryan, Jr., has returned to West Concord to live, after his election as vice-president and treasurer of Ernest Whitman Gross, Inc., distributors of the Sound Scribe dictating machine in northern New England. Leo I. Dana, of New York, research manager for the Linde Air Products Company, became the 17th recipient of the Jacob F. Schoellkopf Medal last spring when he was given this honor for his outstanding work in the field of cryogenics — the science of very low temperatures. — RAYMOND STEVENS, *Secretary*, 30 Memorial Drive, Cambridge 42, Mass. FREDERICK BERNARD, *Assistant Secretary*, 15 Hillside Road, Wellesley Hills, Mass.

### 1918

At the Alumni Day Banquet we were represented by Alan Howard, Lester Conner, Tom Kelly, John Kilduff, Edward Shields, Bill Wills, Carlton Tucker, and your Secretary. Not being a reuniting class, we were pushed not only back but up and this year located in the back corner of the balcony.

Speaking of Tom Kelly, the Gardner News reports the silver wedding celebration given Tom and his wife on June 22. Tom certainly is very highly thought of in his home town. Announcements have been received of the marriage of Jane Robertson, daughter of Walt Robertson, to David Shute Palmstrom in Canton, Ohio, and of Nancy Eales, daughter of our former classmate, Mal Eales, to Charles David Adams in Melrose, Mass. We heard in June that H. Loring Wirt's daughter Sallie was engaged to David Cady Hume, and Herb Polleys' son Rhodes to Susan Rippey.

Thanksgiving is a time for us to be resolute in the ancient faith that life has been good and our stewardship rewarded to a degree beyond our expectations. This is a faith which will be kept tidy and taut in the R. P. Miller household this year; first, because R. P. has celebrated his 20th year as a New England Mutual Life Insurance agent, and second because he has sold over a quarter of a million dollars' worth of insurance.

Maybe M.I.T., in counting up its blessings, should include the fact that Dick Wilkins, Vice-president of the Revere Copper and Brass Company, is on the Visiting Committee for Metallurgy, and Theodore P. Wright on the Visiting Committee for Aeronautics. Widening the base still

further, perhaps Uncle Sam should experience a sense of gratitude to Frank Creedon, who either polished Aladdin's lamp; or rubbed a possum skin in the dark of the moon; or made good use of a native ability, an M.I.T. education, and experience gained in building Old Harbor Village in Boston during the depression and an atomic bomb plant during the war, to produce a million additional dwelling units during 1947 — about twice as many as were built in 1946.

Jim Flint ought to be thankful for the double fascination of our class notes as far as he is concerned. It was with a recognizable sense of poking with a stick of type for news that we reported last spring his spontaneous and undeliberated remark concerning the figure he cut in a Navy uniform. (Blue, say the color experts, is a color which reduces muscular tension.) Now comes an authenticated document attesting the following conversation on last June 2d when Jim was at M.I.T. trying to hire some bright seniors, after all of them had already had their choice of six jobs. "Why don't you get yourself a real ten-gallon hat, Jim? It would look good on you." "I bought this one in El Paso, Texas, and this already looks good on me!" At this point the prof to whom he was talking gave thanks for an ability to retreat into the realm of pure thought.

Thanksgiving at Fred Washburn's house will be crammed with possibilities. Fred has the record 1918 family, three girls and three boys, thus outdistancing Tom Kelly by one incipient engineer. Four of Fred's children are married, and he is four times a grandfather. We got faint just thinking about it.

But the costly groceries and the savory meat will not provide feasting and good cheer for all of us this year. There is an ominous drum beat in international affairs, and sometimes a sad one in our personal circles. George Elz, after 22 years of service, at the end of which he was superintendent of the electrical division of the Edgar Plant of the Boston Edison Company in North Weymouth, died suddenly on August 19 as he was beginning his vacation at Belgrade Lakes, Maine. His two sons, aged 21 and 10, were with him at the time. Their Thanksgiving will be irredeemably impoverished this year.

In the near future, you will be hearing something of our 30th reunion, which occurs this coming June. If anyone has any ideas, please send them to me. — GRETCHEN A. PALMER, *Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

### 1919

Greetings to the Class in our first appearance for the current year. We trust that everyone had a warm and humid summer with some vacation for relief. Your Secretary got to the West Coast in August and enjoyed the San Francisco climate for about a week. He has seen Nelson Bond, Al Richards, and John Meader during the past month. Al Richards was in New York in September for the American Chemical Society meetings. John Meader has left Cleveland and has taken up temporary quarters in New York City.

K. T. Lee of the China Chemical Works, Ltd., in Shanghai arrived there after an extended visit in the States and writes as fol-

lows about the class dinner which we held in New York at the Hotel Winthrop on April 22: "Permit me to thank you for the kindness of arranging for me the party of April 22, when I had the pleasure of meeting so many classmates. Please also extend for me to all those present that evening my appreciation of the privilege of meeting them again and the honor they have so kindly accorded me. Please do me the favor of writing me and telling me the names and present occupations of all those present that evening, as well as their respective courses and addresses. It is my hope that I shall have the privilege of again visiting New York, say a couple of years from now, when I may have the pleasure of meeting all of you again, and I hope more. In conclusion, let me thank you once more and express the wish that this letter may serve to open the way to continuous correspondence between you and me, whereby I may be enabled to learn something of Technology in particular and the trend of engineering progress in America in general."

William H. Bassett, Jr., a lieutenant colonel, has been made commanding officer of the Alabama Ordnance Works, Sylacauga, Ala., having been transferred from the Missouri Ordnance Works, in Louisiana. — Laurence A. Gillett has just become chief engineer of the Virginian Railway, with headquarters in Norfolk, Va. This item was carried in the Newburyport, Mass., *News* of July 30.

George Michelson has been elected president of the Jewish Family and Children's Service. The Boston newspapers carried this announcement on June 26 and stated that George is a trustee of the Associated Jewish Philanthropies of Boston and a member of its budget committee. He is also a trustee of the Hebrew Teachers College and a member of the Boston Committee for Refugees. He is vice-president of the Boston chapter of the Hebrew Institute of Technology and is a member of the New Century Club, and the Harvard Engineers Club.

Ervin M. Kenison dropped a note from 1436 Chapin Street, North West, Washington, D. C., which ran as follows: "There is not much change here. I'm still with the Federal Power Commission working on licensed projects. I used to see Art Blake and some others, but they have left Washington. I hope to come up to our reunion in 1949." — Duke Herzog sent a line from Flossmoor, Ill.: "Nothing much new—I'm in the same place, working harder than ever. We had a grand time at the Compton dinner on ladies' night and a fine turnout."

Erv Kenison's reminder of our reunion in 1949 should cause the Class to set about some preliminary preparations for this big 30-year reunion. Your Secretary would appreciate any suggestions for this affair, which should be scheduled for sometime in June, 1949, I believe. — EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York 17, N. Y. ALAN G. RICHARDS, *Assistant Secretary*, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

### 1920

The following attended the Alumni Banquet last June: F. Badger, Karl Bean, H. Bugbee, P. Bugbee, A. Burke, Scott Carpenter, George Des Marais, Foster Doane,

Jim Gibson, Al Glassett, Dan Lord, F. Maconi, J. Nalle, Bob Patterson, Bat Thresher, Scott Wells, and E. Whitehead. The Secretary was not in the best position to determine how successful and enjoyable the occasion was but has been told by some of those present that it was a good one. A couple of hundred of the Class of '22 somewhat overshadowed us, but we made up in quality what we lacked in numbers. At the Alumni Luncheon, but not at the Banquet, were the Wason twins and Heinie Haskell. We can assure you that despite his war experiences and his sizable industrial responsibilities, Heinie retains all his boyish charm.

It was a great shock to read in the June papers of Ray Ridgway's tragic and untimely death. While on his sailboat in the Niagara River he was a victim of an accident and drowned. Ray was director of research for the Norton Company and was considered one of the outstanding research men in electrothermics. One of his outstanding accomplishments was the isolation and commercial production of boron carbide, the hardest known material next to the diamond. It is used extensively in the drilling of dies, for drawing wire, and in nozzles used in sandblasting. He was awarded the Jacob Schoellkopf Medal in 1943. Ray was vice-commodore of the LaSalle Yacht Club and a director of the Griffon River Front Corporation. He leaves a wife and three children.

Stan Bragdon is in South Milwaukee, at 1250 Fairview Avenue. Arthur Dopmeyer, an Army Colonel, is with the United States Public Health Service in San Francisco. Jack Perkins has left New Britain, Conn., and gone to Wayne, Maine. Warren Chaffin is back from Wheeling, W. Va., and now in Manhasset, Long Island. Foster Doane is now with the Magnaflux Corporation in Chicago, but we believe he is still living at Glens Falls, N. Y. Grant French is with the Chicago office of the Pennsylvania Railroad. Joe Gelders is in Davis, Calif. Art Atwater is in Houston, Texas. Simon Freed is at Oak Ridge, Tenn. Roger McNear has left Los Angeles and is with the United States Rubber Company in New York.

Your Secretary has received reports, but no information, of the death of Francis J. McGill of Medford, Mass., on July 14, and John G. McLeod of Los Angeles on August 6.

We hope you all had a good summer and lots of time off and thereby acquired enough energy and ambition to communicate with your always hopeful, but usually disappointed, Secretary. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

### 1921

Welcome back to the fireside. Pull up a chair and spin a yarn about the fellows you have seen since we last met in these columns. Special greetings to the many newcomers who have joined these monthly meetings via the Alumni Fund route; they are particularly invited to send in their news. We meet on an auspicious occasion marking the launching of Volume 50 of The Review, to whose Publisher, Editor, Business Manager, Editorial Associates, and Staff are extended heartiest congratulations and grateful thanks. In the some-

what more than half its life span which we have shared with The Review, it has grown from a stocky, brown pulp quarterly to a large, attractive monthly magazine, and your continued support assures its further growth.

On the eve of last Alumni Day, Boston was full of hexalphas who had flocked in from all over the country to attend a dinner in honor of Professor Bill Timbie on his retirement. Mel Jenney reports being present and says we were also represented by George Chutter, Dugie Jackson, Jr., Ted Rose, Rufe Shaw, and Royal Wood. He states further that Bill's application for final papers as a permanent member of the Class is being held pending demonstration of ability to attain a satisfactory grade in a P.E.E. final exam. On the same evening, Sumner Hayward and your Secretary attended Dr. Compton's delightful dinner for honorary secretaries of the Institute.

Alumni Day was the objective of 31 members of the Class. At the symposium on "Aviation — Today and Tomorrow," which was held in the afternoon, Art Raymond, Vice-president of Douglas Aircraft, was one of the distinguished speakers. With Douglas since 1925 and successively chief engineer, vice-president in charge of engineering, and a director, Art has also taught aeronautics and served as expert consultant to the Secretary of War and as a former president of the Institute of Aeronautical Sciences. At the 1947 commencement of the Brooklyn Polytechnic Institute, Art was the recipient of an honorary doctor of engineering degree. His straightforward presentation of the airplane manufacturer's point of view on the trend in design was an amazing commentary differentiating between the plausible and the fantastic in the future of air transportation.

Just before the Stein Banquet, an informal class meeting was held at the Statler at which Bob Miller, aided by Chick Kurth, showed the movies and stills which he has made into a photographic history dating from the class picture in 1921 through the various five-year reunions to our quarter-century party last year. A repeat performance continued far, far into the night.

Among those present for the various events were the following: George Chutter, Cac Clarke, Vernie Cole, Josh Crosby, Ed Delany, Chick Dube, Harry Goodman, Dan Harvey, Sumner Hayward, Jack Healy, Dugie Jackson, Jr., Mel Jenney, Chick Kurth, Ted McArn, Charlie MacKinnon, Leo Mann, Bob Miller, Don Morse, Phil Nelles, Lark Randall, Art Raymond, Ted Rose, Jack Rule, Ray St. Laurent, George Schnitzler, Rufe Shaw, Roy Snyder, Ed Steffian, Walter Vitalini, Bill Wald, and Frank Whelan. Mrs Lark Randall served as a member of the Alumni Day Committee in charge of the ladies' program.

The 1947 edition of "The Technology Bookshelf," listing books published by Alumni in the last year, includes Curt Gardner's *Bones Don't Lie*, published by the M. S. Mill Company, New York, and the textbook, *Descriptive Geometry*, by Jack Rule in collaboration with E. F. Watts '20, published by Prentice-Hall.

Received just too late to record in last July's issue, a letter from Bill Emory of Worthington Pump in Holyoke, Mass.,

relates that his son entered the Institute last February. His daughter Audrey was graduated from Larson Junior College in June, and the third youngster is in high school. Bill was too busy sailing his comet to bring the movies he took at the 25th reunion to Alumni Day, but we hope he will send them in for Bob Miller to include in the 1948 show.

It will come as a severe shock to his many friends in the Class to learn of the passing of Chris Nelson at the University Hospital in Baltimore on July 5. Our sincerest sympathy is extended to his wife and family. Irv Jakobson attended the funeral in Annapolis, Md., where Chris made his home at Shiplands' Farm. He and Roy Snyder have been kind enough to write us about Chris, whose illness dated back to a few days after his return home from our 1946 reunion. Chris was born in Jersey City, N. J., and prepared for the Institute at Lincoln High School. At the Institute, he was active in Tech Show and the Naval Architectural Society. After graduation from Course XIII, he was in the yacht brokerage business in New York until 1937, when he founded the Annapolis Yacht Yard, Inc., and became its president. During the war he built motor torpedo boats for England and Russia, and those of the Class who attended the 1941 reunion will recall Chris's dramatic account of his flight to England earlier that year in the interest of the British Navy. Chris was associated with many civic movements and was active in the Annapolis Chamber of Commerce. He was a member of the Masons, Rotary, Annapolis Yacht Club, and the University Club of New York. He is survived by his widow, Mrs Sally H. Nelson, a daughter, Rosamond D. Nelson, and a sister, Dorothea A. Haven, of Annapolis.

First of the secretarial committee over the line with news this month is Architect Walt Church of Portland, Ore., who says the Course IV boys are so busy there isn't any news and then adds these delectable bits: "When Lobby was out here earlier in the summer, I unfortunately was away on a long deferred trip to Banff, Lake Louise, and Jasper and so missed meeting with him and the Tech bunch here. This noon I heard President Conant of Harvard talk before our City Club. Special tables were reserved for Harvard alumni, and who should be sitting at one of them but Harold Cake, Vice-president of J. E. Haseltine and Company. Either Cookie was putting over a fast one and getting a good seat, or he has been hiding his Harvard past all these years. Although Dr. Conant made a very fine speech, he kept saying 'We of Cambridge' do or think thus and so. Does Harvard speak for all of Cambridge, or is it just an old Harvard figure of speech?"

Glenn Stanton was one of the delegates from the Oregon chapter, of the American Institute of Architects, to the national convention in Grand Rapids in May. Walt Church, President of the Oregon chapter of the A.I.A., and Irv Smith, Vice-president, were among those meeting with Earl Heitschmidt '22, of Los Angeles, director of the Sierra-Nevada district of the A.I.A., on his recent visit to Portland.

Next comes Ed Farrand of Chicago, who says he now owns two horses and that he and his wife and son have been doing a lot of horseback riding in the last year. David,

the ardent fisherman at New London in 1941 and now almost 17, has made quite a start at polo. Ed adds to our long and varied collection of miscellany about the irrepressible John Barriger, who for years has been an active officer of the Technology Club of Chicago, with a very complimentary article from *American Business* for August, entitled "Barriger of the Monon" and illustrated with a picture of the youngest class one railroad president in the country at the throttle of one of his new Diesel locomotives. A clipping from the *New York Herald Tribune* tells how John celebrated the 100th anniversary of the Monon with a special train, carrying state officials, which has the entire state of Indiana celebrating for days. Jack Rule sent a broadside on the pilgrimage of the Newcomen Society to Indiana to honor the Monon anniversary for John, who is treasurer of the Washington Newcomen and the first Newcomen lecturer at Princeton University. The *Wall Street Journal* quoted at length John's address to the Association of Railroad Superintendents.

Jack Rule writes from Cambridge as follows: "Wint Dean was an excellent toastmaster at the dinner held by the Technology Association of Minnesota for the Technology staff members attending the American Society for Engineering Education at Minneapolis in June. Ivan Lawrence was also present. The next day he took a few of us for a tour through the Minnesota Mining and Manufacturing Company plant, where he is personnel director."

Class Agent Lark Randall of Boston, who obviously knows his calculus, says: "The report of the Class Agent goes something like this as a result of the recent math problem: 'What the heck were all those funny looking S's?' . . . 'Why make the answer come out 20 bucks when I was set to send in 50?' . . . and so on. However, most of the brethren sensed the real meaning and reacted like shrewd business men. They came through on the short side of enough — just enough to keep your agent haired up."

"I have been Daniel Boone-ing on an island in Lake Winnebago all summer in three tents surrounded by big, fat water snakes and was comforted only too briefly by Charlie Williams (VIPER of New Haven), who joined the party just long enough to shoot 'Oswald,' the grandpappy of all the snakes."

Bill Loesch says that his son, Bob, who completed the freshman year at Technology last spring, has transferred to the Naval Academy. Winter Dean reports from St. Paul that he and Mrs. Dean (the former Muriel Smith '23) celebrated their 25th wedding anniversary in September and are planning a vacation trip to San Diego, where he will look for fresh tracks of the Cambridge variety of beaver.

Roy Snyder of Bloomsburg, Pa., calls himself "just a small town milkman with three sons and a daughter. The young lady is 12, and the boys are 19, 21, and 22." The second son, a towering six-footer, accompanied Roy to Alumni Day and told us he was Annapolis '47 and had just come back from the Byrd Expedition. He is now an ensign on the destroyer *Knight*. The eldest boy, Richard, is studying dairy management at Penn State, and the younger lad is in his second year at the Naval Academy.

Norborne L. Rawlings has been promoted from the rank of captain to that of rear admiral. In the ex-brass department, with decorations and uniforms carefully packed in moth balls, are: Asher Cohen, Robert B. P. Crawford, Frederick S. Dellenbaugh, Paul L. Deylitz, Sydney W. Gould, LeRoy M. Hersum, Andrew I. McKee, and William J. Regan.

What's your news? — CAROLE A. CLARKE, *Secretary*, International Standard Electric Corporation, 67 Broad Street, New York 4, N. Y.

## 1922

The 25th reunion at Marblehead was a great success. For those who were present, there is little point in retelling the story. For those who were not, we will say briefly that more than 200 were in attendance at one time or another and that all agreed the occasion was well worth while.

The new class officers elected for the next five years at the Hotel Rockmere, Marblehead, Mass., on June 14, are as follows: President, Clete Grover; First Vice-president, Bill Mueser; Second Vice-president, Parke Appel; Secretary, Yard Chittick; Treasurer, Ev Vilett; Representative on Alumni Council, Bob Tonon; Alumni Fund Secretary, Warren Ferguson. Regional secretaries: New York, Sam Reynolds; Detroit, Al Browning; Chicago, Fred Burt; Philadelphia, Dexter Shaw; Baltimore, Lachlan Mackenzie; Atlanta, Bill Huger; Northern New Jersey, Larry Coddington; Pittsburgh, John Church; Rochester, King Crofton; Buffalo, Whit Ferguson; Connecticut, George Clifford; Pacific Northwest, H. W. McCurdy; Pacific Southwest, M. A. McClure; Minneapolis, Allen King; San Francisco, Barrett Hindes; Washington, Bill McMahon; South America, John Bower. The regional secretaries have agreed to feed information to the Secretary for use in *The Review*. As news of the Class develops, please see that it is passed along so that it may be published in due course.

Bill Mueser sends his thanks to all who contributed to the class gift to the Institute, and he particularly thanks the members of the subcommittee who helped in raising the fund, of which Horace Ford says, "It is a highly respectable sum and something more than I expected." With this comment we can agree, as the total amount of the fund at the end of the Institute's fiscal year was \$27,309.89. Up to a recent date, there have been no withdrawals by the sons and daughters of members of the Class of '22, to whom it is available. Bill points out that the 25-year gift is not related to the Alumni Fund, which we must continue to support as energetically as possible.

The class picture taken at the reunion is available to other classmates who did not attend at \$1.50 a copy. Send the money and order to the Fay Foto Service, Inc., 45 West Canton Street, Boston. The picture will be sent direct to you within a reasonable time. The reunion golf tournament was won as usual by that well-known collector of silverware, Larry Davis, while the tennis tournament again went to Frank Kurtz.

Bill Mueser's talents in his profession do not go unappreciated, as he has been made a consulting engineer to the United Nations in connection with the development of the site on Manhattan Island and has also been

appointed one of three consultants with the New York Port Authority in connection with New York's airport development.

An interesting letter from Don Carpenter, telling about his experiences in Sweden this summer, follows: "At a banquet for the members of the International Management Congress in Stockholm early in July, I ran into Molbach-Thellefesen, who was better known to us as Claus Thellefesen. He was there as a representative of Norway in his capacity of engineer of Den Norske Ingeniorforening, Norks Sprængstofindustri, and I had the pleasure of seeing him several times later both in Stockholm and in Oslo. He is as handsome as ever and made an imposing appearance at the banquet, wearing the various medals which have been conferred upon him for various achievements. While at Technology, as you may recall, he did an outstanding job on the fencing team. He has followed this up and I believe has been Scandinavian champion, if not European champion, several times and has crossed foils with many of the Royalty in Europe. He has been very active in the Olympic Games and has just visited Finland in connection with the international sports there. His home is in Oslo, Norway, and very soon after the Germans invaded, he became active with the underground. Some of the stories he has to tell make your hair curl and give an excellent picture of the type of patriotism that in the long run prevented the Germans from laying waste to more of Norway than the far northern provinces. Claus is engineer of the foremost shot shell manufacturing concern in Norway. Therefore, we had a great deal in common. He was extremely interested in the 25th reunion and very sorry that he could not attend. Some day I hope he will be coming to the United States to renew his acquaintance with his many friends. Claus's full addresses are as follows: home, Veslekroken 8, Bestum, Oslo; office, Norsk Sprængstofindustri, Øvre Slottsgt 21, Oslo, Norway, Box 229."

The New York *Times* of July 26 states that Robert P. Russell is resigning from the Standard Oil Development Corporation to become technical consultant of the International Basic Economy Corporation. The article continues as follows: "Mr. Russell will survey various agricultural and industrial development possibilities particularly in Venezuela and Brazil, where the International Basic Economy Corporation is engaged in studying the field of food production and distribution. The corporation, of which Nelson A. Rockefeller is president, has been set up to carry out business enterprises that will contribute to raising standards of living by efficient use of the most modern technology and equipment. Mr. Russell will leave within a few weeks for a 10-week trip in Central and South America." Bob's picture in the form of a large pen sketch also appeared in his home town paper, the Worcester *Telegram* of June 29, with comments pointing out his steady advance from the time he entered the research department of Standard Oil of California in 1927.

Donald F. Warner directed the development of the I-40 jet engine used in the Lockheed P-80 *Shooting Star*, in which Lieutenant Colonel Albert Boyd set the world's air speed record of 632.5 miles an hour on

June 19. The engine was developed, tested, and originally produced by the River Works plant of the General Electric Company. In late June, Warner was appointed designing engineer in charge of the jet division at the River Works.

Alan W. Hastings, according to an article in the Newark, N. J., *News*, has joined the staff of Rockefeller Bros., Inc., where he will serve as assistant to the president. Hastings was formerly vice-president of Engineers Public Service Company, Inc., where he had been for 25 years. In 1942, he was elected to fill a vacancy on the Montclair, N. J., Commission and was re-elected as a member on the Citizens' ticket in 1944.

Frank M. Didisheim, *Secretary* of the New York City Housing Authority, left that position on July 1. He had been with the authority since 1939, where he was successively assistant to the chairman, secretary, and secretary-treasurer. In accepting his resignation, the chairman of the authority said, "The Authority was fortunate in having had men of the caliber of Mr. Didisheim on its staff. He has rendered long, faithful, and distinguished service to the Authority, and it is with deep regret that I have accepted his application to terminate his employment."

On May 19, E. I. du Pont de Nemours and Company announced the appointment of Crawford H. Greenewalt as vice-chairman of the executive committee, work which will be in addition to his duties as vice-president and director of the company.

Clark B. Carpenter, now professor of metallurgy and fuel engineering at the Colorado School of Mines, at Golden, Colo., was in charge of a group of 75 seniors and faculty members who recently made a 12-day tour of coal and lead mines, refineries, smelters, zinc and brass and glass plants, steelworks, power plants, and industrial concerns from Denver to Milwaukee, with stops at Chicago, Omaha, Joplin, Kansas City, and St. Louis.

Herbert A. Hickey is now sales manager with the National Research Corporation in Boston, having been transferred from Chicago, where he was district manager in the vacuum engineering division.

It is with regret that we have to report the deaths of two well-known classmates. George W. Potter died on June 16, the day following the end of our 25th reunion. The Class had only two days before sent him a telegram of encouragement for a speedy recovery. George had served as vice-president and treasurer of Hewes and Potter, Inc., of Boston (spur ties), since the death of his father, one of the founders of the company. Surviving are his wife and daughter and a sister, all of Melrose.

Don Walch died on September 6 at his home in Barrington, R. I., after a four months' illness from heart disease. He had returned only a short time previously from Santiago, Chile, where he had been assistant director of the International Machinery Company. Before going to Santiago, Don had been manager of the Providence office of the General Electric Company from 1941 to 1946. He is survived by his wife, two sons, and a daughter. — C. YARDLEY CHITTICK, *Secretary*, Heard Smith and Tenant, 77 Franklin Street, Boston 10, Mass. WHITWORTH FERGUSON, *Assistant Secretary*, 333 Ellicott Street, Buffalo 3, N. Y.

## 1923

On Alumni Day, June 14, twenty-six members of the Class were present, either at the luncheon in the Great Court or at the pre-reunion get-together at the Hotel Statler in the afternoon. I may have missed some but noted the following: Benjamin Albert, Horatio L. Bond, Harry M. Chatto, Howard L. Cobb, Benjamin Cooper, Joseph Fleischer, Harold B. Golding, E. Louis Greenblatt, William B. Greenough, Jr., Franklin K. Haven, Herbert L. Hayden, Arthur R. Holden, George A. Johnson, Forrest F. Lange, John J. Murphy, Harold C. Pearson, James A. Pennypacker, Gerald Putnam, James M. Robbins, E. R. Schwarz, David W. Skinner, Lawrence J. Tracy, Frank J. Travers, Allard M. Valentine, Roy C. Wagner, and Bertram E. Warren.

These notes were written in August, when it was still too soon to announce a time and place for the 1948 reunion. A committee consisting of David W. Skinner is working on the possibilities, and probably before these notes appear, you will have a definite announcement. To predict the number likely to attend in June, 1948, is a difficult job. We have a total class list of about a thousand. Of these, approximately 600 are either graduates or members of the Alumni Association. I have heard from nearly 300 of these, and it is certain from these preliminary replies that 60 to 75 have already made plans to come. All that is before any definite plans are announced, and it is going to be hard to guess as to the number that will actually turn up. The Class of 1922 had more than 200 present this year, or about 265, if you count such camp followers as wives and children. That is perhaps the best clew we have as to what to expect, since the Class of '22 statistics are similar to ours.

I am still hearing from members of the Class and have many names additional to those included in the list which I mailed out on May 15. Harold B. Gray, Vice-president of the Vitreous Steel Products Company of Nappanee, Ind., wrote me that the delay in answering my first letter was due to the fact that he and his wife last March were on a trip during which they spent time on the islands of Puerto Rico, Antigua, Barbados, St. Thomas, the Dominican Republic and Haiti. Gray says, "and I couldn't help but wish that I had a directory of the Class of 1923 packed in my bag. Wouldn't one feel badly if one went thousands of miles from home and then discovered later that someone previously well known was missed by only a little distance?" I am going to publish another list which will serve the purpose Gray has in mind. It will be sent to all those who have sent in information about themselves as requested. I mean to make this list as complete as possible.

Here are some notes about men on whom I have not earlier reported. — Hou Yu Hsu is director of the Jardine Engineering Corporation, Ltd., in Shanghai. He has a son, 21. — I have heard from four in Norway. Peter Petersen is president of the Giertsen and Company, A/S, at Bergen. He has three children. — Harold R. Bjerke is director of a number of organizations. A son, Harald Christian, 21, is now, like his father, taking Course XV-A at the Institute. A daughter, 19, is at Simmons College

in Boston; and he has another son, Fredrik, 15. — Niels Lassen is chief engineer of Schoyens Bilcentraler, A/S, at Oslo. — Georg Vedeler is professor of naval architecture at the Norway Institute of Technology at Trondheim. He has a daughter and two sons.

It is interesting to note that many have well-grown-up sons and daughters. Colonel Archie S. Buyers of Sterling, Ill., reports a son who is a captain in the Corps of Engineers, United States Army, and another who is an ensign in the Naval Reserve. — Myron K. Chandler of Reading, Mass., has a daughter at Tufts College.

Harold Eder, who is general manager of Ingenio Manuelita, S.A., at Palmira, Republic of Colombia, has two daughters at Rosemary Hall School at Greenwich, Conn., and a 12-year-old son at home. — Ralph E. Rubins, whose home is in Evanston, Ill., although he is currently with the Okinawa Engineer District, United States Army, has a son in the Class of 1950 at Dartmouth and a 14-year-old daughter. — H. F. Marshall, owner of the Marshall Oil Company in Quincy, has a daughter who is a Radcliffe freshman.

Hugh D. McKinnon writes that he is now at Evansville, Ind., as production engineer for the Hoosier Cardinal Corporation. He had been with the Aluminum Company of America for 18 years in Pittsburgh, Spokane, and Detroit and was more recently associated with Henry J. Kaiser's aluminum venture in Spokane. McKinnon has a daughter who is a sophomore at Smith College and a 13-year-old son. — John W. Ogg, who is with the National Council of the Y.M.C.A.'s in New York City, has two sons, both veterans, one a junior at the University of Tennessee and the other a senior at Bucknell University.

Milton E. Parker, who is a counselor in food production development, with a consulting office in Chicago, is still proud of the fact that his wedding was attended by all but one of his Course VII classmates. He has a son entering Technology in 1948 and a seven-year-old daughter. — Clarence W. Row, owner of a general contracting company in Pasadena, has a daughter attending Lasell Junior College in Auburndale and two sons, aged nine and five.

George E. Barnes, who is professor of hydraulic and sanitary engineering at the Case School of Applied Science and head of its department of civil engineering and engineering mechanics, sent word that he had become a grandfather on July 9. He wanted to know whether he was the first to report as a grandfather, and I had to tell him that John W. Sands was ahead of him. Sands is in charge of the engineering steels section in the development and research division of the International Nickel Company, Inc., New York, and had declared a grandson, 10 months old. Later, William E. R. Covell, partner in the firm of Parsons, Brinckerhoff, Hogan and Macdonald of New York, and living in San Diego County, Calif., wrote that he had a granddaughter also. The grandfather race will be likely to have a number of additional entries between now and next June.

David Kaufman, who is engineer for a realty firm in Tiverton, R.I., mentions in detailing his war service that he was a captain in the Air Forces in charge of B-29

Flight Engineering School at Barksdale Field, Louisiana. He says that he has a daughter, six, and another born the day before he got my March 15th letter. — Bernard Lewis, who is chief of the Explosives Division of the United States Bureau of Mines in Pittsburgh, reported that he had a son, aged four.

Howard F. Russell, our Assistant Secretary, keeps these notes in mind and on a trip west in May, saw a number of the members of the Class. He had lunch, he said, with A. G. Crowley, who is district sales manager for the Northwestern Engineering Company at San Francisco. He visited with Launcelot W. Hanson, who is with the American Rolling Mill Company at Berkeley. Hanson has a boy lately back from the Pacific and a daughter in high school. He saw Forrest Harmon, who is a partner in Tubesales, Inc., in Los Angeles. All three of these men indicated that they were going to be at the reunion next year.

Russell also had a note from Ernesto B. Ledesma, written from Iloilo City, Philippines. Ledesma says, "I am at present in my native place, Jaro, Iloilo. I am in my own business and no longer connected with the telephone company. I was in the United States in 1939. I went with my wife to attend the 25th reunion of our Class. Had I known your address, I certainly would have looked you up. The Japanese occupation was a nightmare to us. Many of our relatives and friends were killed. My brother and his wife were beheaded by the Japs for guerrilla activities. We have been living from day to day. Now we have to begin all over again. I want to take this opportunity to do a little business. I should like to get in touch with a good jobber there who can buy radios, electrical supplies, machinery, and construction materials for me. Also, I should like to buy Lionel electric trains. Our main difficulty here is to get in touch with honest jobbers in the United States. If you know of a good one, I will appreciate your putting me in touch with him."

John D. Cochrane, Jr., was chosen in June to be director of the research development department of the Formica Insulation Company of Cincinnati. — A clipping from the Worcester Telegram tells of the announcement by Mr. and Mrs. Bernal Falk of Leominster of the engagement of their daughter, Thelma, to Dr. Harold M. Bargar of Winthrop. Miss Falk is a Simmons College graduate and had served two years in the Navy as a member of the WAVES. — Quite a number of members of the Class, along with your Secretary, received invitations to the wedding reception of the daughter, Lyda, of Mr. and Mrs. Eduardo Icaza A. in July, at the Union Club, Panama City, Republic of Panama. — HORATIO L. BOND, *Secretary*, National Fire Protection Association, 60 Batterymarch, Boston 10, Mass. HOWARD F. RUSSELL, *Assistant Secretary*, Improved Risk Mutuals, 60 John Street, New York 7, N.Y.

## 1924

Members of the Class will be grieved to learn of the death of Bill Robinson's wife on July 28 in Cleveland. Ruth was a grand person, and all who met her immediately fell in love with her charm, grace and vivaciousness. We know how you feel,

Bill, and are with you in spirit during your darkest hours.

A series of letters from George Parker, chairman of the 25th reunion, to be held in 1949, indicates great progress in all phases of reunion plans. Blay Atherton is George's principal assistant; Cy Duevel is in charge of plans for an ambitious class gift to the Institute; and George Knight and Frank Shaw are also active on the committee. Bill McCallum has been asked to prepare class movies and for a nucleus will have the 1924 reel which Henry Simonds has been producing in his travels around the world. Plans for the reunion and for a 25-year class book were discussed in Chick Kane's office on Alumni Day last June, where the group included Chick, Bill Robinson, George Knight, George Parker, Nate Schooler, Wink Quarles, and Frank Barrett. Rather than give you the results in pieces, we think it best to wait until the entire plans are mailed out to each of you. These will not only tell you what to expect of the fund, but also how we plan to make the finest gift to the Institute that any class has ever dreamed of. And it will also tell you how you can share in all the plans and fun. Already, the donations toward our 25th anniversary gift to the Institute are coming in. We won't do it yet, but when you see some of the evidences of what real 'sons of M.I.T. '24' are doing, it will do your heart good to know who is coming through. But as there will no doubt be many more of them, we will wait a while before releasing their names. An attendance of more than 20 was registered at the dinner at the Statler.

Several members of the Class have been in the news during the summer. Hood Worthington was named director of nylon research by the Du Pont Company at Wilmington. Another Du Pont man, assistant plant manager at Fairfield, Conn., Dave Sullivan, was disclosed as the inventor of a new chemical sheeting material used to make bullet-proof tanks for airplanes during the war. Jimmie Crist, Vice-president of the South Carolina Power Company at Charleston, is quoted in the papers on the organization of a new firm, the Southern Company, which is expected to acquire certain holdings of Commonwealth and Southern.

George P. and Marjorie (Quinlan) Swift '41 announce the birth on July 14 of George Parsons Swift, Jr. Chick Kane welcomed a new daughter, Electa White, on September 10.

Anatole Gruehr has been elected president of the New York State Professional Engineers, and Greg Shea is vice-president, by way of keeping it in the family. Don Moore was in town from Cleveland on the 18th, and Mal MacNaught and your Assistant Secretary had much fun talking with him. After seeing us he journeyed over to the Engineers Club, where Ed Winingar continued the entertainment in more refreshing forms. Fred Hungerford telephoned last month while he was in town from Syracuse. To remedy a breakdown at his plant, Fred came down and hauled a new ejector back with him.

At the Stein-and-Steak Dinner at Jake Ruppert's on the 18th, 1924 had a table together. Those present included Bill Keplinger, Ed Jagger, Dick Shea, Ed Winingar, Henry Zeiger, Frank di Somma,

Dave Evans, and Nat Schooler. One or two others were scheduled to be on hand but for some unknown reason failed to come.

In the near future we are hoping to have a class luncheon, and notices will be sent out. Our plans include discussion of the details of the class functions in connection with the Compton Dinner at the Biltmore on December 9, and also an expression of the wishes of the New York members on our 25th reunion.

Class notes will be appreciated, but if you haven't time for them do honor Wink with a telephone call when you come to the city. — FRANCIS A. BARRETT, *General Secretary*, 234 Washington Street, Providence, R.I. WILLIAM W. QUARLES, *Assistant Secretary*, 330 West 42d Street, New York, N.Y.

## 1926

Those who missed the reunion at the Wianno Club on the last week end in June will be glad to learn from the following spot report by one of the lusty (and most longitudinal) survivors, Ray Mancha, that it was not an entirely "Lost Week End": "The 1947 season of the Wianno Club was ushered in by the gala 21st reunion of the Class of 1926 members and their wives. Telegraphic and cable messages were received from a few unfortunate absentees, such as: 'Wish I could join you in your fun but daughter Pat's Wellesley '51. We have to start her right this fall. So in '51 I'll be seeing you all.' — Guy Frisbie, Troy, Ohio. 'Awfully sorry cannot repeat last year's spectacular right-field performance in ball game; therefore presume married men will lose. Best regards to everybody.' — David Shepard, London.

"A full program of activities was indulged in. Two days of beautiful sunshine effected the ideal backdrop for swimming, suntanning, and golf (Ralph Head, 82; Jack Larkin, 82; Ray Mancha, 106). The Saturday night dance was greatly enhanced by the array of feminine pulchritude of the wives (God bless them), who accompanied two-thirds of the members.

"The Wianno Club management went overboard in all departments, providing their usual unsurpassed cuisine, service, and drinks. Unlimited supplies of fresh lobster, clams, and other Cape Cod specialties, provided the foundation for the further unlimited supply of Old Grand Dad, Old Taylor, Old Overholt, Old Forester, and Old Crow for the nocturnal conviviality of the Old Grads. Models for the 'Men of Distinction' series abounded (and rebounded) — tall, tweedy types leaned upon mantels, while others just leaned. It was unanimously agreed to hold the 22d reunion in 1948 — same time, same place, same girls."

Pink Salmon, reunion chairman, received notes from several absentees. Bill Rivers, whose reunion notification reached him three weeks after the battle, wrote from India: "If you plan to hold a similar reunion in 1948, I should appreciate it if you would send me an advance air-mail notice to this address [Standard-Vacuum Oil Company, 6 Church Lane, Calcutta]. . . . It is just possible I may be able to reach the U.S.A. about the middle of June, 1948, and if so, I should like to come to any such reunion or gathering which may be held late in June or early in July."

(2)

Martin Staley can be quoted and unquoted from San Antonio, Texas: ". . . There is nothing that I have more ambition about than to pack my wife in the car and make a journey east and show her all the things of interest around Boston and Technology. . . . Some day we will achieve our ambition and at a time when we can attend the functions of the Class and M.I.T.

"During my tour of duty in the Philippines as a major, Corps of Engineers, it was my privilege to attend the meeting of the Technology Club of the Philippines when Dr. Compton and Dean Moreland '07 were the honored guests, right after the atomic bombs were dropped on Japan. Conditions were very bad in the Philippines with regard to food; however, we managed to have a simple dinner, and several of the Filipino ladies got together and made a very small cake with the seal of the Institute on the frosting. My small share in the affair was to furnish a hundred pounds of ice from our mess, to make ice water with — yes, ice water, as the liquor was not fit to drink. Both Dr. Compton and Dean Moreland made very interesting talks, and we were holding our breath in the hope of learning something about the bombs, but we were disappointed, as they did not tell us of them. . . ."

It is with deep regret that the Secretary records the passing of two of our classmates: C. Francis Jenkins, Jr., of Neenah, Wis., died on June 18; and Harry R. Gamble of Fort Lauderdale, Fla., on August 16. I know that I am acting in accord with the wishes of our entire Class when I extend to the families of our former classmates the sympathy of the Class.

A large number of address changes have come to all class secretaries as a result of the "Information Please" questionnaire sent to Alumni for the new Alumni Register. All the up-to-date addresses cannot be listed, but we have singled out a few men whose locations have gone unnoticed in these columns for some time.

James H. Boyd, Jr., until recently eastern representative in research and development for the Phillips Petroleum Company of Bartlesville, Okla., has opened offices in New York City as a chemical consultant on technical and economic problems. He is specializing in the economic appraisal of chemical markets, patents, and projects in petroleum hydrocarbons, chemicals, and emulsion polymerization. — Harold S. Rogers is now with the Carbide and Carbon Chemicals Corporation at Oak Ridge, Tenn. — Duncan A. Crawford, formerly with the Stone and Webster Service Corporation in New York City, is now operating vice-president of the Atlanta Gas Light Company situated in Atlanta, Ga.

After Navy service, Allen G. Clarke is now with the International Paper Company in Boston. — Arthur E. Benson is technical director for the United States Rubber Company in Detroit. — Joseph D. Bates, Jr., who lives in Longmeadow, Mass., is advertising account executive for Wilson, Haight and Welch, Inc., in Hartford, Conn. — Richard W. Plummer is now in Mexico, where he is vice-president and general manager for E. R. Squibb and Sons de Mexico S.A. — Robert G. Maxwell, whose home is in Stone Harbor,

N.J., is fire prevention engineer with Improved Risks Mutuals, Inc., in New York City.

The minister of the First Congregational Church at Ellsworth, Maine, is Malcolm A. MacDuffie. — William H. Borghesani, a resident of Plymouth, is an electrical engineer with Stone and Webster in Boston. — Gilbert J. Caro-Delvaille is vice-president and executive assistant of the California Electric Power Company in Riverside, Calif. — Robert A. Cunningham is sales manager for T. B. O'Toole, Inc., in Wilmington, Del. — Edwin E. Spitzer is group supervisor for the R.C.A. Radiotron Company, Lancaster, Pa. — Harold Fox, formerly with General Electric in Boston, is now application engineer with the Fox Engineering Company, Boston. — William R. Franklin, who served as a commander in the Navy, is project engineer for the Vermilya-Brown Company in New York City. — Kenneth E. Hill is with the Underwood Corporation in Hartford. — Frank B. Dyer is practicing architecture in Cortland, N.Y. — Frederick E. Walch, Jr., has returned to Paris from Cambridge and continues with the Dewey and Almy Chemical Company. — After service as a colonel with the Chemical Warfare Service, Stanley Cheney has returned to the Plymouth Cordage Company, where he is fiber purchasing agent. — Edmund G. Bromilow has been transferred to the Canal Zone by General Electric. — JAMES R. KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

## 1927

The 20th reunion has come and gone and has been voted an enormous success by us all. Endless credit is due Ezra Stevens for making all the preparations and Ezra and Jim Lyles for running the show on the spot. Ninety class members were on hand, an excellent attendance. The weather proved perfect; and East Bay Lodge, by mutual agreement, the right selection as the site of the reunion.

Jimmy Doolittle '24 came as promised and made an unforgettable, although impromptu, talk at the class dinner on the night of Saturday, June 21. A. M. Kazazian, now in Antofagasta, Chile, cabled his regrets at being unable to attend and bought a round of drinks for all present. This note will convey the Class's thanks to him. Jim Collins is having a list printed of all those present, complete with short biographical sketches, for distribution within the next few weeks.

With the success of the 20th reunion still freshly in mind, your President met with a small group in Boston early in September and took the first step toward organizing the 25th reunion. Glenn D. Jackson will be in charge of the 1953 gathering and will also organize the work to be done between now and then for the class gift to the Institute on that occasion. Details of this will go forward to you in due course.

From the Worcester *Telegram* we learned that Hector A. Moineau brought about the settlement of a strike at the Marlboro Wire Goods Company, which he represented in the negotiations. The Springfield, Mass., *Union* reports the marriage of Jim Castner to Mildred Fletcher Jones of Springfield. They will be at home in Wilmington, Del., on November 15 after a wedding trip to Eu-

rope. Jim was in the Navy during the war and is now with Du Pont. Frank von Brecht checks in from Post Office Box 946, 2610 M Street, Bakersfield, Calif.

Here are a half-dozen autobiographical sketches which have come in during the summer. It really makes my job easier to have received them.

Francesco Marcucella, 87 Walsh Street, Medford 55, Mass.: "I've been trying to build buildings and at the same time keep labor, material, and overhead costs within owners' budgets — which can't be done. I've been on inactive duty since May 6, 1946, after serving with the United States Marines in the Civil Engineers Corps as a commander for 32 months. I saw duty in the New England states, Chicago, and Pearl Harbor, Oahu. What a heavenly place the islands are! Before entering the armed forces I supervised construction of many projects such as the Bath, Maine, housing project; the Bedford Airport housing; the Navy Barracks at Hingham, Mass.; Navy facilities at the Squantum Naval Air Station; a shipyard for the Dravo Corporation at Wilmington, Del.; Watertown Arsenal additions; the Waterman Memorial at the University of Vermont; the Cadet Armory and other facilities at West Point, N.Y., for General Jacob L. Deven; the Medford Post Office, Medford, Mass.; the Southwick Memorial, University of Vermont; the Worcester Auditorium, Worcester, Mass.; an M.I.T. dormitory; a United Shoe Machinery office building in Boston, and many other projects. It seems to me I must be the best builder in the Class."

G. F. Flaherty, 1003 Concourse Building, Toronto, Canada: "After 1933, in the midst of the 'Terrible Thirties,' I had no fixed abode, being engaged on several mining jobs in the north country 'bush' until 1935. During 1935 and 1936, I was on the staff of the Geological Survey of Canada, with residence at Ottawa, Ontario. From 1937 to date, I have been in consulting practice, with an office in Toronto. I spent part of the winter of 1946 in New Mexico, examining some mining properties for Toronto mining interests — a very pleasant change of locale for a Canadian miner in winter. While in New York on business last month, I met Bill Callahan '26, who also happened to be in the city at that time, at the Mining Club. It was the first I had seen of Bill since the date mentioned above, — 1926. We exchanged compliments. We each saw little change in the other — no corpulence, no double chins — both fit, lean, and athletic-looking. Geology, we concluded, was a great conditioner. Or was it, perhaps, simply that we both still worked hard for a living?"

Henry A. Ingram, a captain at the San Francisco Naval Shipyard, San Francisco, Calif.: "We moved out here from the Philadelphia Naval Shipyard (we were living in Paoli) last January. We were fortunate, these days, in being assigned to very comfortable quarters in the yard and have enjoyed living here a lot. On June 21, Helen presented me with John Gerard, 8 pounds, 14 ounces, at the Mare Island Naval Hospital; both are now at home, and everything is fine. The girls went to camp at Los Gatos for their first experience of the kind. I am second in command of the shipyard and planning officer with collateral duties as assistant industrial man-

ager of the other private shipyards of the Bay area and budgetary control officer. My oldest son, Victor, was married in the spring to a school friend from Arlington, Va., and Judy had seven pups. That's all for now."

Lieutenant Colonel Paul N. Ivancich 0245115, United States Army Headquarters, 552d Engineering Group, A.P.O. No. 751 in care of Postmaster, New York, N.Y.: "I am at present with the 552d Engineer Composite Group at Bremen, Germany, where we are doing the construction and maintenance of this port. Bremen is the port of debarkation and embarkation for our forces in Germany. I am the 'operations officer' of the Engineers here, charged with the design and construction. We are at present building a staging area for all arriving and departing troops, dependents, war brides, displaced persons, emigrants, United States civilians, and even a 'pet staging area.' I have been in the Army since November, 1940, most of the time in the training of troops and shall probably be here another year."

Lieutenant Colonel Laurence B. Cheney, Milan, Tenn.: "On a long-term basis, events have moved pretty slowly for me, but this change came like a 'bolt out of the blue.' After spending 10 years in the United States Rubber Company, seven at Naugatuck in the engineering end of rubber footwear manufacture and three in the service in Washington, I was transferred down here to set up the engineering department and to operate as plant engineer. We have a small war plant converted to sport shoe manufacture. As production began only in March of this year, we are not up to capacity yet. A few equipment installations are still to be made, and then, of course, we have to start reducing maintenance costs and at the same time keep production expanding. The greatest problem right now is housing. My wife and children — Susan, 11, and Stephen, six — are living with me in two rooms until we can get a real home."

Albert H. Burton, Roma Wine Company, Fresno, Calif.: "As you know, I was stationed in New York City throughout 1944 and 1945, serving as division engineer of the North Atlantic division of the Corps of Army Engineers. During all of 1946 and January of 1947, I served in Washington as director of real estate for the War Department. At the end of January, 1947, I applied for voluntary retirement from the Army, and on the 1st of March went to work as executive assistant to the president of the Roma and Cresta Blanca Wine Companies. Our headquarters are in Fresno, Calif., which is also the location of the Roma-Fresno Winery, reputedly the world's largest. The number of plants and ranches (vineyards) and the fact that they are pretty well separated make supervision and administration of the system a sizable and most interesting job. The housing situation is extremely bad — even worse than it was in Washington throughout 1946, and I thought it was bad enough there. After two and a half months in a hotel, however, we succeeded in renting a small apartment and so have considered ourselves very fortunate."

Let me hear from you. — JOSEPH S. HARRIS, *General Secretary*, Shell Oil Company, Inc., 50 West 50th Street, New York 20, N.Y.

## 1928

In our first notes for this new volume of The Review, may I remind you that our 20th reunion comes next June. Already plans are shaping up under the leadership of Roland D. Earle, X, XII, President of the Union Bay State Chemical Company in Cambridge. Roland was elected chairman of our 20th at a meeting of the Class held under most convivial conditions at the Hotel Statler last June after the annual Alumni Dinner. Although Roland and his committee have not as yet set the date of the reunion, present plans indicate that it will be held on Cape Cod, at one of the very popular resorts. Please watch this column for further developments.

Our Class was well represented on Alumni Day, considering that it was not a reunion year. The following men were in attendance: Jack Barnes, Monty Burgess, Earl Crawford, Chet Day, Jim Donovan, Roland Earle, Lazare Gelin, Bill Gorfinkle, Bob Harris, Thurston Hartwell, Ralph Jope, Wally Keyes, Bill Kirk, Dave Mattoff, Johnny Melcher, Dave Olken, Lou O'Malley, Walter Smith, Fin Sparre, and Abe Woolf.

During the summer months, Jim White, from Nashville, Tenn., visited Cambridge. After a lengthy conversation and much prying, we learned that during the war our Jim was Colonel James M. White, whose principal assignment was as deputy assistant chief of staff at the G-2 headquarters in the European theater of operations. Among Jim's many ribbons and decorations are included the French Legion of Honor, the Order of the British Empire, the Bronze Star and Cluster, and the Legion of Merit. Jim is now secretary of the M.I.T. Alumni Association of Nashville, and will be delighted to renew acquaintance with any members of the Class who pass through that section of Tennessee.

You will note that my address at the bottom of these notes has changed. I am now in New York with the Kenyon and Eckhardt advertising agency at 247 Park Avenue. When you are in New York please call me: when in Boston, give Ralph a ring over at M.I.T. Between the two of us, we'll have some notes in each issue of The Review. Please watch for further news on the 20th reunion. — GEORGE I. CHATFIELD, *General Secretary*, Alden Estates, 33 Priscilla Lane, Port Chester, N.Y.

## 1930

Welcome once again to our column in the first issue of Volume 50! The Alumni Fund campaign is well under way under the guidance of our efficient Class Agent, Phil Holt. Several months ago Phil was promoted to the assistant directorship of one of Standard Oil's research divisions. Howie Gardner is the new director of research and development for Fibreboard Products in Antioch, Calif. He was formerly head of the chemical engineering department at the University of Rochester and received his doctorate from the Institute. We are indebted to Jack Latham of Arthur D. Little, Inc., for the news of Howie's new position. One of our classmates, Leroy Marek, has been elected vice-president of Arthur D. Little. He has been with that company since 1934 and during the last several years has been in charge of its chemical engineering activities.

Charles May is now on the faculty of the University of Minnesota as professor of pediatrics. To Phil, Howie, Leroy, and Charlie — our best wishes for continued success!

Class President Bennett has returned to Akron from a 7,400-mile trip to the West Coast which included visits to all the national parks in the Northwest, but no '30 men were encountered en route. Your Assistant Secretary will be delighted to receive and pass along news concerning any and all of you in the Chicago area. We expect to be able in the very near future to report the appointment of an assistant secretary in the New York region, so that our news coverage may be broadened.

At the Alumni Day dinner in June, our Class was represented by seven men, and a cable was received from Joe Harrington, in Leicester, England, on a business trip, expressing his regrets at being unable to attend. Those present were Bill Harris, Vice-president of American Bosch in Springfield, Mass., Warren Martell, safety engineer for the Veterans Administration in Boston, George Shrigley of the employment division of the Commonwealth of Massachusetts, John Mathews of the Army's General Staff in Washington, Myron Smith of General Radio, Hermon Scott, President of the Technology Instrument Corporation, and your Secretary. Scotty reported the birth in May of the second Scott. George told us that Harvey Chapman was his brother-in-law, the father of one child, and was with the Evans Company in Detroit. A good time was enjoyed by those present, although we were sorry not to have seen more of you there. Better put Alumni Day on your agenda for June, 1948, and June, 1949, and start saving now for that 20-year reunion in 1950! — PARKER H. STARRATT, *General Secretary*, 1 Bradley Park Drive, Hingham, Mass. ROBERT M. NELSON, *Assistant Secretary*, 332 South Michigan Avenue, Chicago, Ill.

## 1932

The 15th reunion was certainly a success for all who attended it. Tom Sears, as chairman of the reunion, did a very fine job. As I do not have the names of the committed members before me and do not want to take the chance of overlooking the fine work of anybody, I shall have to put off a complete report on the reunion until the next issue.

Rolf Eliassen, a professor at New York University, was unable to attend the reunion but wrote a letter to Don Gilman with a copy to me. He says that his work is very interesting and that he has been exceedingly busy on research work and sanitary engineering as well as in teaching an exceptionally large group of men. He guarantees that he will make the 20th unless something drastic interferes. We certainly hope that others of you who were unable to attend this reunion will make similar promises to yourselves. From the clipping bureau we have several news items: F. Bingham Walsh of Rye, N.Y., became engaged to Virginia Terrell of Hampton, Va., a graduate of the Farmville State Teachers College, Farmville, Va. Isaac Schwartz of Fall River was married to Tylda Golenpaul of New Bedford on June 8. Mr. Schwartz is with the Schwartz Lumber Company of Fall River. Albert A. Stewart was married in Boston on August

2 to Clara O. Martin, a graduate of the Rhode Island School of Design. He is an instructor at Bradford Durfee Technical Institute. R. L. Strong joined Johnson and Higgins of Boston as manager of their inspection and engineering departments.

Our President, Don Gilman, while he was up from Jackson, Miss., for the reunion, devoted considerable time to improving our class organization. Some of the plans he has made should do much toward knitting us together as an effective alumni group. In future issues of The Review, we will do our best to reflect the new interest generated in those who attended the 15th reunion. — CLARENCE M. CHASE, JR., *General Secretary*, 1207 West Seventh Street, Plainfield, N. J. *Assistant Secretaries*: CARROLL L. WILSON, United States Atomic Energy Commission, Washington 25, D.C.; WILLIAM A. KIRKPATRICK, Allied Paper Mills, Kalamazoo, Mich.

## 1933

We have a news clipping from the *Lawrence Tribune* indicating that Michael de Stefano of Lawrence will appear in the stage show, *Brother Rat*. The play will have an all-veteran cast. He attended Technology before enrolling as a drama student at the Geller Theatre Workshop. Recently he has appeared there in *Room Service*, *High Tor*, *What Price Glory*, and *Reunion in Vienna*.

The Hartford *Times* reports the engagement of Regis Angela Lyons to Alexander J. Minkus. Their wedding is planned for early fall. He is an engineer with the Metropolitan District Water Bureau. We also have an announcement of the marriage of Amy Hopkins Fitch to Duke Selig on July 8 at Dallas, Texas. — The National Research Corporation of Cambridge, Mass., of which Richard S. Morse is president, has just announced the formation of British American Research, Ltd., which has recently been incorporated in Scotland.

A letter from Theron C. Johnson reads in part: "Since graduation I have been with General Electric, mostly in Schenectady, N.Y. doing a variety of engineering jobs, including a three-year stretch guiding the advanced engineering training courses. In 1942, I went into war work — stuff for military applications. This happy time lasted until late in 1945, when I transferred into engineering personnel — the recruiting, hiring, and placement of engineers. Again in late 1946, I jumped at a chance to design heat pumps and went to work for the air conditioning department in Bloomfield, N.J. I had a wonderful time but in less than six months was offered a chance to come to Fort Wayne. I am now in charge of the development and design of compressors and condensing units for refrigerating machines — great fun, daily headaches, wonderful engineering opportunities — nothing like it — anyone want to join me? — if so, write."

A letter from Ed Lloyd follows, in part: "There is nothing very interesting to the rest of the bunch about me. I spent four years as a civilian in uniform, maintaining Army posts. No medals, no decoration, merely some nice personal letters from my bosses. I got out about a year ago and joined Bill Kingswell, long established with Minneapolis Honeywell temperature controls, to take on the distribution of Janitrol gas heating and Smithway water

heaters. I am vice-president of the firm, in full charge of the gas equipment part of it. I began alone a year ago and now have four salesmen. The new address only means that civilian pay is somewhat better than that of an Army officer, and thus that we are now renting a house instead of an apartment. My wife and eight-year-old daughter seem thoroughly to enjoy it; I don't see enough of it. I'd be delighted to hear from some of the Class, having lost track of them all. I saw a few during the war — Roy Lampell, now in Japan, I believe, and I. Madsen, my business manager on *benchmark*, who did a swell job in the Engineers — get him to tell you about his trek through Japanese lines from India to the interior of China. Best regards to all the boys — some of whom are industrial tycoons, by now, no doubt."

A letter from Emil T. P. Neubauer runs, in part, as follows: "Since leaving the Institute I have found a job at the York Machinery Corporation (now York Corporation) not in my line, but a job. After a short training period on the drafting board, I was moved to the development department, where the duties were the development and design of small room air conditioners. From here the move was made to the compressor department, where the first major problem was to eliminate the vibration troubles caused by the low-speed, partially balance-reciprocating compressors. This resulted in the writing of 'Isolation of Vibration for Refrigerating Machinery,' an article presented at the 36th annual meeting of the American Society of Refrigerating Engineers. In February 1943, a call was received from Columbia University to enter war research. This was completed on March 2, 1947. After some laboratory success, this work was followed to the production stage at Allis Chalmers. I cannot claim any outstanding personal contribution, as my job was to put the scientific findings into actual practice. The best explanation of this work (as far as can be told) is given in a paper by P. C. Keith '22, under the subtitle of 'Pumps and Pump Seals,' which appeared in the February 1946, issue of *Chemical and Metallurgical Engineering*. Now the choice has been made to remain in the nuclear energy field, at least for the time being. I hope for the opportunity to visit M.I.T. next summer for the reunion."

Last minute notes picked up at the M.I.T. Club of New York party at Ruppert's Brewery, on September 18: A good time was had by all. Cal Mohr was in town for the Chemical Show and spent the evening with us — as did Jack Andrews, still with General Cable, and Guido Garbarino, still with Westinghouse International. Cal Mohr mentioned a few names from Chicago: Al Munson is with Business Research, Chicago; John Streng is with Inland Steel Company, Chicago; Pete Parker, with Kolar Labs in Chicago; and we understand that Gil Ayres is with the Lederle Laboratories.

At the moment we are working on plans for the 15th reunion next June, and you will hear from us in the near future. — GEORGE HENNING, *General Secretary*, Belmont Smelting and Refining Works, Inc., 330 Belmont Avenue, Brooklyn 7, N.Y. ROBERT M. KIMBALL, *Assistant Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

### 1934

The Alumni Day dinner in June drew a goodly number of our classmates together to raise their steins on high and talk over old times at the Institute. Toward the end of the dinner we circulated a card and asked those present to autograph it and state their occupation. The following is a list of those who were present: Franklin Baxter, assistant manufacturing manager, machinery division, American Optical Company; Robert M. Becker, structural engineer, 50 Beacon Street, Boston; Joseph Bicknell, Associate Professor of Aeronautical Engineering, M.I.T.; Christian Born, President, Air Markings, Inc., 79 Milk Street, Boston; Constant W. Chase, Jr., electrical engineer, Balboa Heights, Canal Zone; Bill Dobbins, Fay, Spofford and Thorndike, engineers, Boston; Arthur B. Ellenwood, Jr., manager, Horn Brothers, Inc., building construction, Boston; Joe Fishman, Smithcraft Lighting Division, Chelsea; John Hrones, Assistant Professor of Mechanical Engineering, M.I.T.; Simon Malkin, Gerstein and Cooper Company, 1 West 3d Street, South Boston; Rudy Mooradian, 164 East 61st Street, New York City, manager, rayon division, Pacific Mills; Henry A. Morss, Jr., 6 Arlington Street, Boston, Vice-president, Simplex Wire and Cable Company, Cambridge; Bob Roulston, assistant to division sales, manager, auto screw machines, Scovill Manufacturing Company, Waterbury, Conn.; Leonard Shapiro, textile research division, Alrose Chemical Company, Cranston, R.I.; Malcolm S. Stevens, Division of Industrial Cooperation, M.I.T.; Fred Vaughan, co-ordinator, Grinnell Lithographic Company, New York.

Herb McKeague has just been promoted to a higher position with the Westinghouse Electric Corporation. He is now purchasing agent for the home radio system at Sunbury, Pa. Formerly Herb was assistant to the vice-president in the purchases and traffic division at Pittsburgh. He joined the company in 1940 as buyer and assistant purchasing agent in the industrial electronics division at Baltimore and two years later was transferred to the transformer division at Sharon, Pa., as purchasing agent.

Dan Cupid is still active in pursuing our unwed classmates. — John T. Burwell was married on June 21 to Katherine Despard, daughter of Mr. and Mrs. Clement L. Despard of Rumson, N.J. Pete Barry was one of the ushers at the wedding. John served four years in the Navy and was placed on inactive duty as a commander. He is now teaching at the Institute. — Benedict Peter Mazzucco was married on July 26 to Mary Agnes Smith, niece of Peter Hanlon and Miss Ella C. Hanlon of New York. Benedict was a naval architect and marine engineer during the war and at present is associated with the L. A. Dreyfus-Wrigley Corporation as a project engineer. — Horace L. Woodward, Jr., was married on August 15 to Eugenia Clark, daughter of Mr. and Mrs. Arthur D. Clark of Hillside, N.J. The couple are making their home at Lake Hiawatha, N.J. — Louis Zolan walked altarward on August 31 with Evelyn Hyman, daughter of Mr. and Mrs. Wolf Hyman of Bridgeport, Conn. Louis is now secretary of Ralph Zolan

Distributors, Inc. — Mrs. Morris Cohen of Bath, Maine, announces the engagement of her daughter, Ruth, of Cambridge, Mass., to Herbert L. Gamer.

Well, that is all the news this time — pretty skimpy for the first fall issue. How about it fellows? — JOHN G. CALLAN, *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, Chile Exploration Company, Chuquicamata, Chile.

### 1937

To all those who missed the 10th reunion — "Too bad!" We all had a wonderful time and perfect weather, combined with an attractive hotel — the Mayflower in Plymouth. According to the best counting available under the circumstances, there were 61 of us at the banquet, with 22 ladies at a gathering of their own. These figures (not necessarily the ladies') were verified by Joe Heal on my left and Dave McLellan on my right.

Dave had come back from the West Coast between jobs and pleasantly surprised us all by arriving in time for the banquet. After preliminary skirmishes with "visiting firemen" featuring George Ewald, Bob Thorson, and a few others, we all got down to the business of eating, drinking, and heckling between such as Dick Young and Jack Simpson, all the rest and yours truly when it was time for the "few words of a serious nature." This concerned the question of finance and the proposal of a class gift at our 25th reunion. Various plans were suggested; these are to be reviewed by a committee, and recommendations will be made to the Class. Phil Peters then gave the report on the questionnaire results, in which you will be very much interested, I think.

Replies were received from 40 per cent of the Class proper — a response which we consider very high, speaking well for the Class as a whole, in the way it backs up the fine work of its committees. (Unfortunately, Bob Harris wasn't able to be on hand to enjoy reading these figures. Joe and Marion Heal deserve special credit for their work in tabulating the results.) The results follow: The average age is 32½; the oldest, 39; the youngest, 30. As against 63% five years ago, 91% are married, and 78% of the married couples have children. The average weight is 167 pounds, 59% having gained. Ehrler Wagner gained most — 50 pounds (but he doesn't show it; George Randall had changed most, in my eye). The average waistline is 33.3 inches, an increase of 1.2. We learn that 62% retain all their hair; 3.8% have lost one quarter of it; 15% have lost half; 17.7% have lost three-quarters; 0.6% have lost all. (That's where Yours Truly shines.) The wartime status was 52% in defense; 25% in the Army; 13% in the Navy; 1.2% in the Marines; the rest in business. Most are now back in peacetime pursuits. Working in the field of their major course at the Institute are 66%; and 87% enjoy their work. In descending order, 86% drink; 63% smoke; 26% attend church. Politically 58% are now Republican; 12½%, Democratic; 29½%, of other or no party. Back in 1942, it was Republican, 51%; Democratic, 17%; other or none, 32%. Of our Class, 67½% would send their sons to Tech; 38½% give their wives flowers. Classmates

average 7.25 hours of sleep a night. Robert Wylie gets four hours — all he wants. One lucky fellow gets nine hours. Cars are owned by 90%; 1% have two.

Suggested changes for Technology were as follows: move it out of Massachusetts; put the tuition down; move it below the Mason-Dixon Line (quiet, Blakel); teach a little more human engineering; restrict brown-baggers and improve coeds; make the Fraternities coed; serve free beer at lectures.

The anonymous questionnaire yielded the following: The present average income is \$6,990 with a high of \$28,000, a low of \$1,080. Five years ago, the average was \$3,200, ranging from \$400 to \$8,200. The life insurance average is \$18,770; high, \$70,000; low, 0. The average value of home is \$13,650; high, \$28,000; low, \$3,000. The net worth averages \$21,700, ranging from \$250,000 down to \$1,000 in the hole. The taxes paid average \$1,035, ranging from 0 to \$10,000. Five years hence the average expected salary is \$11,000, with a high of \$100,000 and a low of \$1,000.

To all those who missed this year's reunion, I think we can all say that you certainly missed something, and that we shall hope to see you early Friday on the week end of our next reunion — the 15th.

A few notes about the comings and goings of individuals follow: Leonard I. Schiff, who was formerly with the Los Alamos atom bomb project, has gone to Stanford University as associate professor of physics. D. J. O'Conor, Jr., was elected vice-president and a director of the Formica Insulation Company in Cincinnati. Walter Sherry, who was at the reunion, is operating as a consulting engineer in Williamsburg, N.Y. He is also an assistant professor in electrical engineering at the University of Buffalo. Jim McLean is now manager of the Philco Television Broadcasting Corporation's television station WPTZ in Philadelphia. Since graduation, he has held important positions in radio and television engineering and sales. Francis D. Houghton has opened a new chemical analytical consulting laboratory in Wilmington, Del. The firm is known as Houghton and McDowell, Inc. The laboratory makes general chemical analyses of various substances submitted by business concerns and individuals. C. Olson Pike has been appointed technical director of the Bishop Gutta-Percha Company in New York and the Peters Manufacturing Company in Wollaston, Mass. R. Kenneth Jackson and Maurice Baer are with the Veritas Company at their new laboratory in Jamaica Plain, Mass.

A few engagements, which by this time may be marriages, are those of Vernon C. Kreuter of Rochester, N.Y., to Mrs. Sarah L. Basinger, and of George O. Tapley of Brookline to Frances Porter Pratt of Stirling, Mass.

Marriages include the following: Joseph A. Smedile to Martha L. Durloo of Macon, Ga., John G. Goldfuss to Kathleen van Vechten Smith of Garden City, N.Y., Charles M. Dierksmier to Mary Peavey of Milford, N.H., J. Thomas Egan to Helen L. Merriam of Marblehead, Mass. — WINTHROP A. JOHNS, *General Secretary*, 34 Mali Drive, North Plainfield, N.J. PHILIP H. PETERS, *Assistant Secretary*, 7 Kirkland Circle, Wellesley Hills 82, Mass.

### 1938

Engaged: Dick Rosenberg to Anne Denenberg of Newark, N.J., on May 11; Solomon Kaufman to Sylvia Wolfson of Dorchester, Mass., on July 13; Paul O'Connell to Marie Brissette of Melrose, Mass., on July 31.

Married: Bill Preston to Nancy Womwell, Lexington, Ky., on May 10; Nathan Einis to Florence Einis, Providence, R.I., on July 5; Lloyd Bergeson to Carol Stokes of Moorestown, N.J., on September 6.

Born: To Ascher and Sylvia Shapiro, a second daughter and third child, Bennett Mary, on August 9, to Al and Carol Wilson, a second daughter and third child, Sarah Leete, on September 20.

Employed: Richard V. Gaines with the National Lead Company at Tahawus, N.Y.; Lloyd Bergeson with the American Machine and Foundry Company, New York; Arch Copeland, Jr., with Revere Copper and Brass, Inc., Detroit; Cornelius van S. Roosevelt, formerly manager of the mining and construction division of the William Hunt and Company, Inc., in their Shanghai office, now general manager of the firm in their Manila office. Bruce Old has been appointed consultant to the division of research of the Atomic Energy Commission, in the capacity of chief metallurgist. Dr. Old will continue his present work with Arthur D. Little, Inc., Cambridge, Mass., industrial research laboratory, and will serve the Atomic Energy Commission on a part-time leave of absence from Arthur D. Little, Inc. Dr. Old will assist in organizing the work of the commission in the metallurgical field. In his recent work with Arthur D. Little, Inc., Dr. Old has been particularly identified with development of the technique for operating pig-iron blast furnaces under pressure, with consequent increase in iron output. During the war he served as commander of the Office of Research and Inventions of the Navy, where he was engaged in planning and co-ordination research on guided missiles, jet propulsion, and metallurgy.

Bob Treat recently moved with his wife, Janet, and two daughters to North Troy, N.Y., where he was able to rent a house. He is technical supervisor at the new Waterford plant of General Electric, which is putting G.E. in the chemical business on a large scale, playing with silicones. Treat reports seeing Forrest Judkins in Lenox, Mass., Jud being another G.E. man. Jud married a widow some time back and is well set up with a family.

Arthur Dyer has bought the Donlan Foundry Company at Gardner, Mass., which he is now operating. He had been with the Hunt-Spiller Manufacturing Corporation in South Boston and later at the Fore River Shipyard of the Bethlehem Steel Company. He has changed the name of the foundry to Gardner Foundry. He was married in 1942 and has a child, Jane Carol, born January 13, 1946. Paul Tillson lives in Washington, where he is working for a patent law firm, Semmes, Keegin, Robinson and Semmes. About a year ago, he and Caroline were married; she had three children at the time, so he has quite a family already.

Anthony Chemel is with Hopkins-Roselund Associates; J. J. Phillips, Jr., with

Standard Oil of New Jersey; E. P. Neumann, in the Gas Turbine Laboratory at M.I.T., married, with two children; Bert Grosselfinger, with Hydrocarbon Research, Inc., in New York; Thomas Garber, in the Dynamic Analysis and Control Laboratory at M.I.T.; Harold McCrensky is a consultant industrial engineer and metallurgist.

Fred Kolb was in Cambridge in June to get his doctor's degree. Frank Kearny has turned farmer! He is raising *ramie*, a fiber plant new to the South, which seems to be doing very well. Frank has two children, Frankie, Jr., and Mathilde.

Our 10th reunion comes up in June; save the second week in June for it; there will be more information later. — DALE F. MORGAN, *General Secretary*, Carbide and Carbon Chemicals Corporation, 30 East 42d Street, New York, N.Y. — ALBERT O. WILSON, Jr., *Assistant Secretary*, 32 Bertwell Road, Lexington 73, Mass.

### 1940

Joe Havens writes in that he and his wife took a month's tour through New England last spring and early summer. They spent much of their time seeing friends made while they were attending school in that section. Joe says that he and Paul Witherell and Bill Hagenbuch met for several sessions. Paul is still running the Solar Energy House on Memorial Drive. According to Joe, "Paul was as full of Yankee friendliness and hospitality as ever, generously turning over the Witherell place on Cape Cod to us for several days. Bill Hagenbuch has a kind of 'development engineering' job with the Hoover-Allison Company, a rope manufacturing company in Xenia, Ohio. He was traveling around to find out why rope manufacturing is so far behind other fields in methods and how to change the situation. According to a sales engineer of the Norton Company, Joe Owens is doing very well at retailing machinery, gradually taking over the responsibility from his father, I gather. He is married and living near Syracuse. Dave Morganthaler is married and working for the Ervite Corporation in Erie, Pa. As for my own work, it is far from decided. My wife is from Beloit, Wis., and is a teacher of Oriental religions."

John H. Halford, Jr., sent us the following bits about his years since 1940: "After about three and a half very happy and eventful years with Division Eleven of the Radiation Lab, I returned in December, 1945, to a new job with the company for which I had formerly worked, the Arlington Mills. Finding things somewhat changed, however, after the war, I resigned about a year later, and on February 1 of this year joined the staff of the Forstmann Woolen Company as assistant superintendent of worsted combing and spinning. We therefore left our wonderful little home in Andover, Mass., and moved to Ridgewood, N.J., to be near the mill in Passaic. Further news concerns the arrival of a daughter, Laura Jean, on June 15, Father's Day, to round out a most satisfactory family of a Wellesley educated wife, two boys, both of whom are already planning to become Tech-trained engineers, one girl, and a cocker spaniel."

George Kaneb writes that since last February he has been with the Houdry

Process Corporation, Marcus Hook, Pa., in the technical service and plant operation department. He says, "I spent four months in Alma, Mich., starting up a new catalytic cracking unit, and they were cold and stormy months. The natives say they have only two seasons, winter and the fourth of July. If the weather this spring is an indication, I believe them, but being from Canada, I didn't mind it much. I saw Beano Goodman in Fort Wayne, Ind.; he's sporting a new Buick convertible, working out of Madison, Ind., on a new venture.

Dorchester High recently adopted the custom of presenting the varsity Dorchester "D" now and then to an alumnus who never won a letter in school but then went on to "win his letter in life." The man thus honored at this initial presentation last May was Harry Bushloff, now a successful operator of his own business in Providence, R.I. In his four years at Dorchester High, he had only one grade of *B*; all the others were *A*'s. He was then graduated from our Class and became an Army major.

Fred A. Libby has been doing very well in Hollywood, having received several smaller parts in present pictures; and recently he was tested for the role of Sampson in Mr. de Mille's forthcoming Biblical drama, *Sampson and Delilah*. — Born to Robert G. Fife and wife on May 11 was a son, James Marshall. Bob is a stockbroker with the Pasadena office of Dean Witter and Company. — The Lowell Textile Institute announces the appointment of Albert L. Carpenter of Andover as an engineering instructor. Since his discharge, he has been assistant plant engineer at the Textron plant at Suncook, N.H. — Also at L.T.I., the new president is Kenneth R. Fox, M.S. in Textile Technology.

Mr. and Mrs. Bernard Greene announced the arrival of Andrea Susan Greene on last April 23. William C. Ellis and Winifred Nixon were married in July. Lewis R. Aronin and Natalie Eleanor Wolfson were also married in the early summer. The following weddings have taken place since our last printing: Richard Freeman McKay to Pamela Duryee Richardson; George Schneller to Nancy Loomis; George W. Carnick to Ruth Walter; Robert K. Deutsch to Marcia Schreiber, and in August, John McEvoy to Edith Ketola.

Let us have some news, fellows. — H. GARRETT WRIGHT, *General Secretary*, Garrett Construction Company, Post Office Box 629, Springfield, Mo. THOMAS F. CREAMER, *Assistant Secretary*, 6 Berkley Road, Scarsdale, N.Y.

## 1941

Dot and Joe Gavin came forth with the announcement of the birth of Tay Ann Gavin on August 25; the Gavins put out the cleverest announcements in our Class, and some of the fellows have been scratching hard for odd ways of saying, "We have a new member in the family." George Swift '24 and his wife, Marjorie (Quinlan), were joined by George, Jr., in July.

The engagement list is a long one, indicating that marriage was not strictly a war institution. Mildred Turansky is engaged to Walter Turansky, who is now a

structural designer for the Kellogg Company in New York City. Marguerite Lydon will be the future Mrs. Bob Parry. John Murdock's name appeared recently in an engagement announcement with Janet Kennedy as his partner. John is in the construction business out in Arizona. Julia Emerson is the future Mrs. Alan Smith. Bill Cherry has been doing graduate work at Princeton while working for the R.C.A. laboratories in Princeton. Patricia Nichols, a Radcliffe graduate, has been working at the offices of Princeton University. On July 12, they were married. Sophia Belinkie is to become Mrs. Arthur Weinberger. Art is with the E. R. Squibb Company in New Brunswick, N.J. Dorothy Duemler of Newton Highlands is engaged to Charles Jones. Charley was in the Air Forces during the war and has recently returned to M.I.T. to earn his master's degree. Elga Steinherz, a Ph.D. candidate at Radcliffe college, is engaged to Harry Wasserman. Harry spent the last few years in Africa, disguised as an Air Force captain and sent us pictures of the fierce mosquitoes of the moist area. At present he is working for a doctorate at Harvard and is an instructor of chemistry at Cambridge Junior College. Marie Smith, of Loretto Academy, and Santa Fe's valedictorian in 1942, has left the International Minerals and Chemical Corporation in anticipation of an assignment as Mrs. Pierre Hartshorne. We recall meeting Pierre in New Orleans shortly after he was pulled out of the sea when a German submarine had torpedoed his ship. Pierre is now engaged in atomic studies at the Los Alamos Laboratories in Carlsbad, N.M. Ada Whitworth is engaged to Ed Brady out in Seattle, Wash. Beverly Sweatt of West Acton, Mass., became Mrs. Mason Downing on August 2. Mason received his M.S. at the Institute in 1947 and is now a member of the research department of the Standard Oil Development Company of New Jersey. Lynn Adams and Francis Vinal were married in July and are living in Cambridge, where Frank is an assistant professor at the Institute. — STANLEY BACKER, *General Secretary*, 101 Providence Road, Primos, Pa. JOHAN M. ANDERSEN, *Assistant Secretary*, Saddle Hill Farm, Hopkinton, Mass.

## 1942

Warren Loud has left the Institute and is now an assistant professor at the University of Minnesota. He also plans to be married shortly. Before he left, he asked me whether I would take care of this column since I am one of the members of the Class still around Tech. I happen to work in the Admissions Office and as a result come in contact with members of the Class who come back here. Some who have returned are B. J. Driscoll, Bob Rines, and Stan Golembi. B. J., who is married and living in Westgate, has decided to get a degree in XV-A. Bob Rines received his LL.B. from the Georgetown University law school in 1947. He is a patent lawyer, in practice with his father, is married, and has a baby. Stan is working for the Laboratory for Electronics, Inc., in Boston and is taking a little work at the Institute on the side. Mike Stein, who is working

for his Ph.D. in Physics at Penn State and is on the staff there, dropped in recently with his wife and baby. He likes his work very much. He and his family look fine.

The reunion was a big success. Too many reported for me to list here, but we all had a fine time and enjoyed Lobby's talk. Quite a number of fellows who were not able to come to the reunion wrote letters to Warren explaining their absences and telling something about their activities. Fred Sargent, who is now an M.D., is interning at the Presbyterian Hospital in Chicago. George Arnold is in Cincinnati, doing research in hydrology for the new River Forecast Center there. He and his wife have a daughter who is almost a year old by now. The Bob Cunninghams and the Bill Bolhofers each have a son born in May of this year. I have a daughter, born on September 15 — just in time to make this issue of *The Review*.

Charles Kennedy wrote a long and very interesting letter. To quote a part of it: "I am currently getting an informal liberal education to balance the technical one at M.I.T. I am now working as an attendant in a mental hospital and finding it very satisfying. Last year I taught engineering subjects at Howard University, while seeing politics and national government in action in Washington. I am still eager to travel overseas, but so far have achieved only a few days in Poland on a cattle-boat trip under the auspices of the United Nations Relief and Rehabilitation Administration. M. P. Pancu, who is now with Consolidated Aircraft in San Diego, and I are finally getting a paper on vibrations published in the *Journal of Aeronautical Sciences*." The greater part of his letter, which unfortunately is too long to quote here, concerns his reactions to Dr. Compton's position on military training. Charlie is dead opposed to military training and would rather see the money used for foreign rehabilitation and construction.

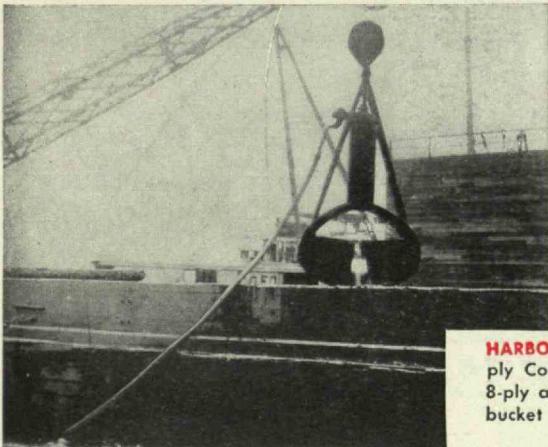
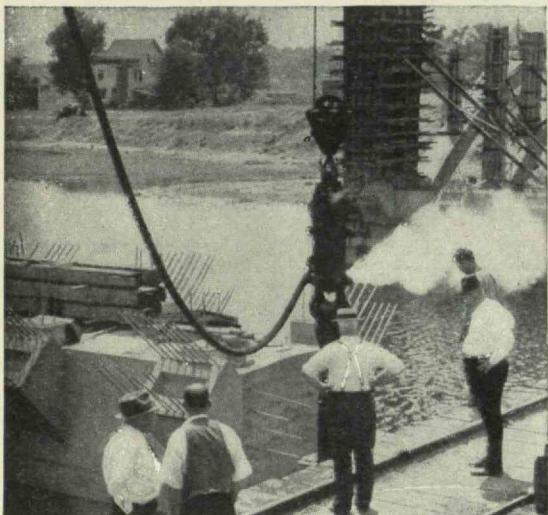
Bob Osborne has received his Ph.D. in Physics and continues here on the staff of the Physics Department, being primarily concerned with 8'01. Ed Thode has been made an assistant professor of chemical engineering at the University of Maine. Paul Crandall has recently married a French girl and is now working in Holland for his father. He will return to the United States shortly. Al Clear, Malcolm McGregor, Thomas Carroll, Bob Howard, Ed Pepper, Dick Whipple, Charles Wirsing, Ken Leghorn, Dick Lovelace, Irving Kotlier, and Bob Krucklin have all recently been married. If anyone has any news or would like to get anything off his chest, write to me, and undoubtedly it will appear here. — JOHN W. SHEETZ, *Acting Secretary*, Room 3-108, M.I.T., Cambridge 39, Mass.

(An emergency beyond our control has made it necessary to defer until the December issue publication of the 2-44 and 2-46 notes submitted for November. The Review takes this opportunity to express its sincere thanks to the secretaries of these classes for their co-operation in an unusual situation.)

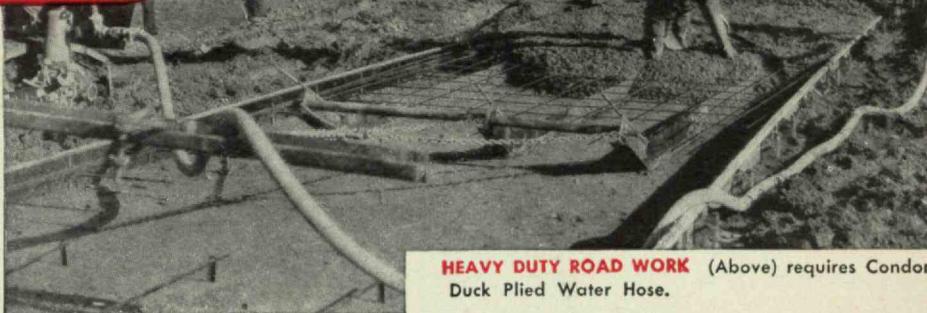
**Contractors prefer**

# Manhattan HOSE

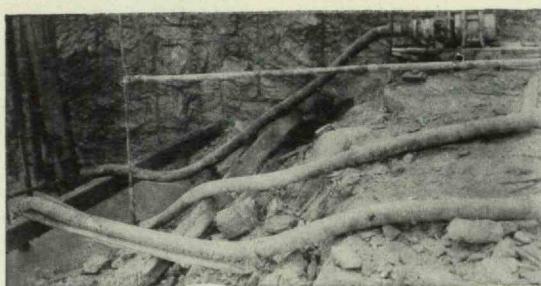
**PILE DRIVING** (Below) with Condor Pile Driver Hose on a bridge project.



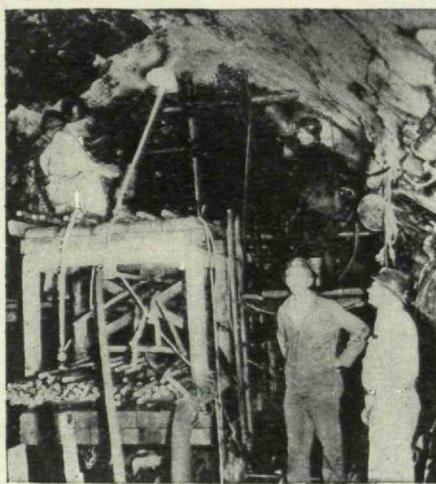
**HARBOR WORK**—Left: 2" 6-ply Condor Hydraulic Hose, 8-ply activating a clam shell bucket on a dredge.



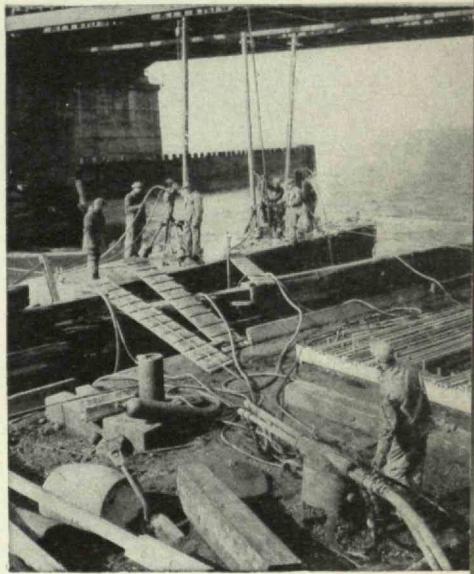
**JACKHAMMERS**—Right: Condor Homo-Flex Air Hose, lighter, easier to handle on Jackhammers. Exceptionally resistant to ragged rock punishment.



**DAM EXCAVATION**—Above: Draining low portion of a dam excavation, 300 G.P.M. against 90' head. Manhattan Suction Hose stands up on big jobs.



**NANTAHALA TUNNEL**—Condor **RAILROAD BRIDGE**—Above: Drilling 30' 2" Tunnel Air Hose and Homo-Flex Air Drill and Water Hose holes in concrete piers of old railroad bridge, job that calls for Condor heavy duck used in driving a 5-mile river-dry tunnel in Nantahala, N.C. highly flexible Homo-Flex Hose on drills.



On jobs like those pictured here, profit depends on pushing up the schedules. You can't afford hose failures when men and machinery must wait for replacements. Condor hose constructions are engineered for

the heavy demands of big projects. Each hose is built for a specific service . . . You can rely on Manhattan's 54 years of engineering experience for hose that keeps you ahead of schedule.

*Bulletin 8688 shows many other case history photos of Manhattan hose, conveyor belts, transmission belts and V-belts in action on history-making construction jobs. Your copy will be sent with no obligation.*



## RAYBESTOS-MANHATTAN INC.

*Keep Ahead with Manhattan*

MANHATTAN RUBBER DIVISION

Thomas H. Boyd, '23

Wilder F. Perkins, '25

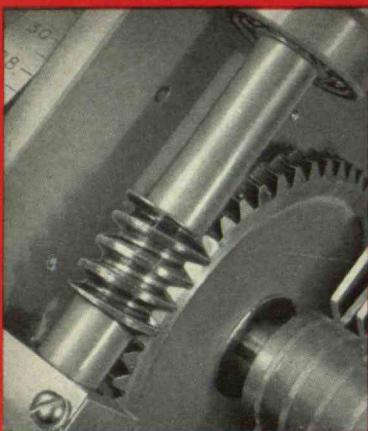
Charles P. McHugh, '26

PASSAIC, NEW JERSEY

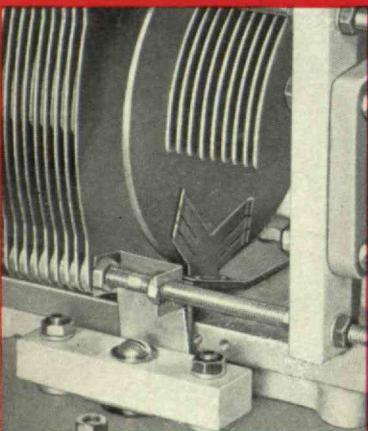
Daniel J. Hanlon, '37

Albert W. Beucker, '40

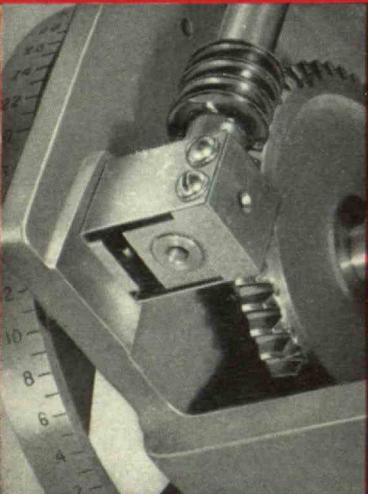
# Even GREATER Accuracy



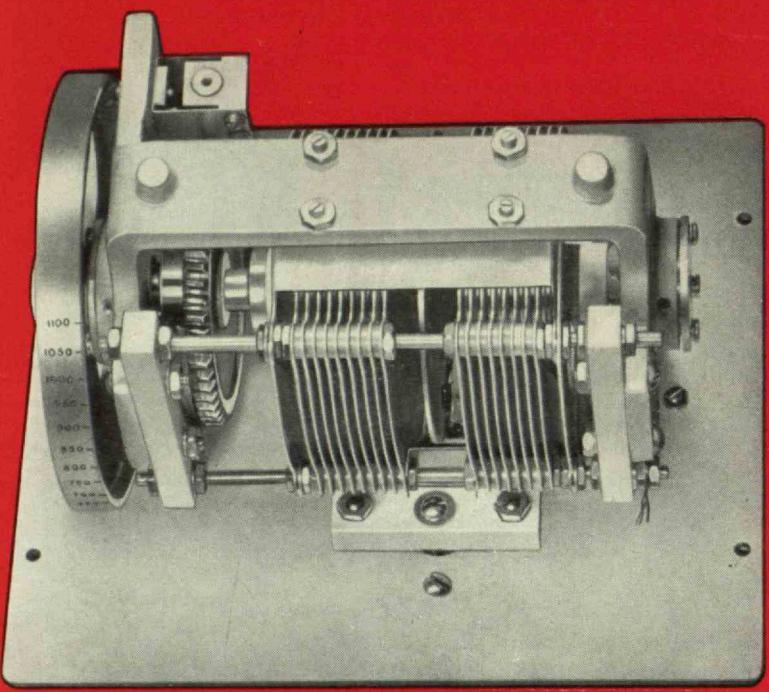
This 50-to-1 worm drive, equipped with a 3 1/2 inch dial, is used for the fine setting adjustment. Backlash in the drive is kept very low by cutting the worm and its shaft from an integral steel shafting, eliminating eccentricity due to setscrews and misfit.



Two small, waxed steatite bars insulate the stator plates. A Figure of Merit ( $R_w C^2$ ) of  $0.05 \times 10^{-12}$  is secured. Connection to the rotor is made by spring-tempered silver alloy brushes bearing on a silver-overlay brass disc.



The worm shaft is held to a tolerance of 0.0004 inch; radial eccentricity of the worm gear is less than 0.002 inch. The main rotor shaft is held to a tolerance of 0.0005 inch and its bearing surfaces to 0.0002 inch. Ball bearings are used on worm and main rotor shafts.



## from this PRECISION CONDENSER

Long used as the standard of variable capacitance throughout the measurements industry, the G-R Type 722 Precision Condenser has recently had its guaranteed accuracy increased.

All models of the Type 722 condenser are now supplied with a correction chart on the front panel. The Type 722-N Precision Condenser (illustrated) is direct-reading to  $\pm 1 \mu\text{f}$ . When the charted corrections are applied to the direct-reading settings the accuracy is increased to  $\pm 0.1\%$  or  $\pm 0.4 \mu\text{f}$ , whichever is greater, and correspondingly the accuracy for capacitance differences is  $\pm 0.1\%$  or  $\pm 0.5 \mu\text{f}$ .

### SPECIFICATIONS

- **CAPACITANCE RANGE:** 100 to  $1100 \mu\text{f}$ , direct reading
- **STANDARD CALIBRATION:** Direct reading in  $\mu\text{f}$  at 1 kc to  $\pm 1 \mu\text{f}$ . Mounted correction chart gives corrections to  $0.1 \mu\text{f}$  at multiples of  $100 \mu\text{f}$
- **WORM CORRECTION CALIBRATION:** For very precise measurements a worm correction can be supplied. When worm corrections are applied capacitance can be determined within  $\pm 1 \mu\text{f}$  or  $\pm 0.1\%$ , whichever is greater, and capacitance differences to  $\pm 0.2 \mu\text{f}$  or  $\pm 0.1\%$
- **METALLIC RESISTANCE:** Series resistance about 0.008 ohm at 1 Mc
- **SERIES INDUCTANCE:** Approximately 0.024  $\mu\text{h}$
- **TEMPERATURE COEFFICIENT:** Approximately  $\pm 0.002\%$  per deg. C. for small changes

**TYPE 722-N PRECISION CONDENSER . . . \$160.00**

Worm Correction Calibration . . . . . 50.00

**ORDER NOW — A few in stock.**

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